# Authentic

SCIENCE FICTION MONTHLY 1/6

No 50



*Through the sand storms of Venus!*

This Month's
**FEATURED NOVEL**

**IT TAKES TWO**
by H. K. BULMER

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ONE SHILLING and SIXPENCE

# Authentic

SCIENCE FICTION MONTHLY

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Half a century—and not out! With our fiftieth number we are still batting strong and—some say—first in the field. Whatever be the relative merits of the British science fiction magazines in print today, there seems to be little doubt that *Authentic* holds an honoured place in the ranks. It is even contended that we have added a few things to the *genre*—one or two new authors, new slants in stories, new kinds of covers, new types of features, and so on. That, perhaps, makes us proudest—to have contributed something to the pattern of British science fiction, while some other British science fiction magazines, it may be whispered, are *still* stealing ideas from the more enterprising ones. However . . . imitation but rarely succeeds . . .

So, what do you get on this auspicious occasion? Well, you get a rather nice long story by Kenneth Bulmer. Some people will think that it is not quite as good as some of his previous pieces, but it's well worth reading all the same. E. C. Tubb, a name that's cropping up all over these days, gives us a sort of weepie about the remote future. An erstwhile non-fiction contributor, George Duncan, gives us a variation on the "last few minutes" theme. Then we have two more new authors—S. M. Lane and K. E. Smith, each of whom contributes a very short piece to this issue, though I hope to publish longer ones from them later on.

Non-fiction is fully up to standard for our half-centenary. We are starting a new series of articles written by a man whose pen-name is Professor Delwood; this nom-

de-plume disguises the identity of a Professor of Mathematics at one of the provincial University Colleges. But don't get scared; the articles are not on mathematics. Professor Delwood will be dealing with some of the odd corners in astronomy and physics, and space flight. His piece this month is in defence of the idea of an expanding universe.

Other stimulating articles are about the ways of science, the brain and the mind, the march of science, Einstein, and how spaceships move around. The science fiction club that gets a boost this month is the Manchester crowd. This doesn't seem to have an official name at the moment, but the article helps to clear up a few of the puzzling points about this peculiarly friable group. Book reviews and fanzine reviews, together with readers' letters, complete the bill of fare. Oh, and of course, some ads.

I hope you like the repast. If you don't, write and tell me. How else am I going to know what to give you? Some editors seem to think they have a God-given power of knowing what readers want. Not *me!* I give you what you ask for, and if you don't ask for it you don't get it. Moral in that, somewhere.

Now read all about this month's cover. See you in November.

H.J.C.

## THIS MONTH'S COVER

We have moved on from Mercury to Venus. It is a little cooler, but not much. The sky is not so black, but it is not a pleasant blue, either. It is a horrible sulphurous yellow, murky and writhing, incredibly thick and opaque. In fact it seems to come right down and touch the ground only a mile or two away. There is no real horizon; only the deceptively close termination of a fog.

Around our feet there is dust. Yellow dust, fine dust. Dust that would get into your eyes and your ears and your nose and stuff them all up tight until you died a choking, dust-vomiting death. It covers your boots. It covers your ankles. You wonder whether, at the next step, you might sink right down into the stuff.

Surrounded by the dust and the sick-rolling clouds and the craggy rocks, sparse and mirage-like, there is only one point in living—to get to the top of the dune. Yet you know full well that when you get there, another dune will lie ahead, and beyond that another one. Just on and on, dune after dune around the whole hell-like planet.

Here is none of the lush vegetation that science fictionists sometimes prattle about. Here are no slim-limbed princesses. Here there's just the dust and the clouds and the rocks and the one foot after the other . . . and a tremendous dull ache in the heart.

An ache for Earth.



Even in the remote future it was still true that where quarrels are concerned—

# IT TAKES TWO

by

H. K. BULMER



AN odd, fugitive little memory kept obtruding itself into his head and chasing itself around in the pain-enveloped vacuum of his mind. He was not consciously aware that his body was performing the mechanical actions that had not ceased since the lifeboat crashed. Lift right leg, push forward, lower, slide on gritty sand until it found a purchase. Lift left leg, push forward, lower . . . on and on and on . . .

His mentalarm chafed at his forehead with every step. Wearily he tried to adjust it and heard Garfon's voice from the rear all chopped up into ragged half-words by his clumsy slithering steps over the never-ending desert.

"We'll have to kill myself pretty soon if we don't make better progress."

He tried to ignore the fluttering memory and to concentrate on what Garfon was saying. Garfon and he were more closely united in the bonds of their service than were any twins. Garfon was acknowledging the grisly fact that he might have to die. An orange, overlarge sun was sliding rapidly down the sky, laying ragged and indefinite bands of crimson and yellow that merged into the ochre desert.

"We've only another ten miles. Can you make it?"

"I don't think so, Jarril," Garfon said. "My knee suffered greater damage than we thought. You'll probably have to go on alone."

"Undoubtedly you're right." Jarril automatically analysed Garfon's words, their context and tone. He'd used two imponderables, two concepts of hazy meaning—"I don't think so" and "You'll probably." Jarril halted his long mechanical stride and waited for Garfon to close up, watching unemotionally the painful hobble that had resulted from the knee injury. Loss of blood. Fatigue. Undue strain on heart. Relaxation of critical perceptive faculties.

"Keep your screen tight, Garfon," Jarril said sharply.

"That's all right." Garfon threw himself down on the sand beside Jarril and clumsily rolled back the leg

of his coverall, already stiff with dried blood. "My screen will keep up as long as is necessary."

"When was your last pep-tablet?"

Garfon glanced at his wrist-watch. "One hour ago. It should have lasted me for three hours, but already I feel the need for another."

"We know that the Sokkath picked up our lifeboat almost as soon as we'd left the ship. There is a ninety-nine per cent. chance that we avoided them up until the time of the crash on this planet. Approximately fifty per cent. certain that they've picked us up again. We've ten miles to the settlement—there's a ninety per cent. certainty it's a settlement and not a city—and at normal regulation speed I can reach it in two and a half hours." Jarril looked down at Garfon, slumped in the sand with his damaged leg bared and the swelling lump and blood-stains disfiguring his knee.

He said: "I find it a hundred per cent. resolution that you will not reach the settlement, Garfon."

Garfon rolled over and sat up. "Just walk off and leave me, Jarril—no, sorry, that's out. You'd have to make sure I did die."

Jarril said nothing.

Garfon pulled his weapon from its dark leather holster, checked the load and carefully brushed away a few grains of red sand. Moving with deceptive ease, Jarril took the gun away from his companion and thrust it into his belt.

"Not that way, Garfon," he said, and there was almost reproach in his voice. That tickling memory came back with the action, and a vague regret that Garfon could obviously not have received a hundred per cent. graduation passout. "That would be a waste of a charge. In the situation confronting us, with the Sokkath in pursuit knowing that we know the location of their most powerful battle fleet, we must exercise every fragment of strength we possess. Even a single charge of a hand gun."

"You're right, of course." Garfon put a trembling hand to his head and pushed the

helmet back, ran his fingers through his hair. "I can't think straight. The pain is beginning to dislocate my co-ordination."

That had begun some time ago, Jarril knew with a quick flash of anger at himself for his own lapse. He should have investigated Garfon's capacity to carry on before this, before so much time had been wasted. With an abrupt movement he drew his knife and handed it to Garfon.

"Thanks, Jarril. I'd better use my own. You can start at once and waste less time."

Jarril accepted his knife back and stood waiting.

Garfon licked his lips and brought his water-bottle round, flipped up the cap and raised the half-full bottle to his mouth. Quite naturally, Jarril barred the completion of the movement, took the bottle away and corked it, hung it on his own belt.

"Sorry, Jarril." Garfon stared dully at his knife.

Glancing at his wrist-watch, Jarril scuffed his foot suggestively in the sand. Already the sun was bisected by the horizon and black shadows stretched away from the dunes and ridges and crops of boulders tossed haphazardly across the desert. Garfon tightened his grip on the knife without saying any more and took a deep breath.

When it was over, Jarril methodically removed all Garfon's equipment. What he couldn't carry he would dispose of some distance away from the body. Already cold was chilling him between his shoulder blades, where sweat had collected and dampened his shirt and coverall during the rapid dash from the smashed lifeboat. Finally he surveyed the scene, selected a fair-sized boulder and heaved it to shoulder height with one fluid lift of arms and shoulders.

He brought the boulder down with all his strength onto Garfon's skull.

That should—in fact, he shook his head annoyedly at his own lack of definition—it *would* prevent the Sokkaths from reading the information contained in Garfon's brain cells. The aliens' neural recall surgery technique was in the same class as that of the

Terrans. Any cells from a brain dead for less than a couple of hours could be subjected to infinitely deep probing, the resultant electrical impulses translated into the memories of that brain.

And the knowledge in Garfon's brain, like the knowledge in Jarril's, was of utmost importance to the Sokkaths.

Jarril resumed his steady regulation tread towards the settlement they had seen just prior to the crack-up. If he had known just how bad Garfon's knee injury had been he could have been approximately five miles nearer his goal by now. He carried out a strict self-analysis and felt irritation at the discovery that the crash had reduced his own efficiency. The settlement would have to provide an ultra-light radio to transmit the location of the Sokkath battle fleet to Earth, and then he would demand the full hospitality of the settlement in order to regain his required one hundred per cent. efficiency. A vague uneasiness permeated him at the distasteful knowledge that he was below par, a feeling of guilt and a definite feeling of shame. He was glad that his tutor could not know of the c u r r e n t situation — the thought of the contempt resultant upon below-par activity brought a hot flush to his cheeks. And the realisation that he was flushing brought in turn a sickening ache at the amount below par at which he was functioning. He recognised the vicious cycle and deliberately thrust those thoughts away.

Immediately that nagging little memory flooded in.

Making a careful check of the full horizon, the zenith and all points between with the night filters in position on his glasses gave him something to do. When he was confident that, as far as he could tell, the Sokkaths had not so far picked him up, he allowed the itching memory to ride in full strength. Strangely, it brought peace . . . and memories . . .

The strongest thing that came back to him was the feel of his prefects' sash, its gold tassels falling in strict regulation length to the top of the

map-pocket of his battle-dress. The feel of the sash and the way the sun beat on his back as he watched the coach round the last bend and grumble to a halt in the quad.

Then Jenson, head janitor, had hobbled across and angrily told the driver to pull over into the unloading park. Jarril smiled inwardly at that —and mentally erased the smile and became the fully-trained guardsman. Smiles and jokes were for the kids. And he had left all the kid stuff behind him. This was his last day at the Academy.

From the coach a melee of scrambling boys boiled out into the sunshine, their faces round and smooth with youth and all the eager, erratic convulsions of boyhood sending them hopping and jumping and skylarking together. One youngster tilted old Jenson's peaked cap over one ear and the rest giggled in enjoyment at the jest. They made fun of him as he patiently pulled their luggage from the coach roof; one emptied a water-pistol into his ear, another gave a laughter-choked imitation of the old janitor.

Their school caps and blazers were of different colours and designs, and Jarril looked, without great hope, for one that he knew. The old school sent very few boys to Spatial Academy. Perhaps that was one reason why he had been so desperately studious and determined to graduate. Something to do with not being able to keep a good man down.

When the boys began arranging one of their number behind the old janitor, and the others getting ready to rush him in a fool's tumble, Jarril decided it was time he showed himself. He stepped forward, conscious of the swing of the sword at his side and the hours-deep polish on his insignia.

One boy spotted him, and turned into a stone statue.

The others looked, and the hush that fell was punctuated by old Jenson's hoarse breathing as he loaded the last of the baggage aboard his handcart. Jenson shuffled off, and Jarril waited patiently until the old man was out of earshot. Even though these

entrants before him were only green boys, they would, one day, be officers like himself, and no officer reprimanded another in the presence of inferiors. He looked the lads over, aware with no amusement at all that they refused to meet his eye.

A month at the Academy and they'd stand straight-backed before the Admiral of the Fleet in person.

Five years, and they might well be standing where he was now, wearing the sash of a prefect. And by that time they might understand something of what was meant by discipline and efficiency and evaluation of the probable course of immediately oncoming events. Some of them might. Looking them over, Jarril, knowing that he was working on insufficient data when dealing with the human mind and character, yet gave a forty per cent. chance of eventual graduation to the group before him.

The sun still beat on his back, but there was a chill creeping in somewhere, too. A chill and a growing awareness that night was swooping down with the abrupt sinking of a swollen, oversized sun behind an ochre and desolate desert horizon.

Jarril fumbled one hand to the hilt of a sword on his hip that, strangely, didn't seem to be there. He eyed the group of apprehensive boys before him, a group of boys that in some odd way at times appeared to be just a pile of boulders.

"You're entrants to Spatial Academy," he said, his still young voice straining to be harsh and cold. "Always remember this. Correct evaluation and action is dependent on one hundred per cent. efficiency."

He stopped speaking in surprise, and found to his annoyance—because he had not yet evaluated the reasons for it—that he was face down in gritty red sand. Some grains plastered the inside of his mouth and he spat them out and worked his tongue around a few times. He pushed himself up on arms that felt like flower stems. His mind grappled with the problem and then went white-hot in anger.

Jarril fumbled at his belt, took out a pep-tablet and washed it down with a short, sparingly-doled swig of water.

The reaction made him shudder. He blinked his eyes and then scoured the flat expanse of desert, dark and cold, with the night glasses. He should not have needed that pep-tablet for another hour, at least. His efficiency was down, and for a microsecond of doubt he hesitated before finding out just how much below par he was. That tiny instant of doubt gnawed at him, making him rigorous in his examination.

Garfon must have felt like this.

And what Garfon had done he must do likewise, if necessary. He would have to arrange a convenient boulder and trigger it with his handgun. What was the matter with him? Of course, the charge from his weapon would ensure that the Sokkaths would have no brain over which to pore and probe and discover secrets. It was very cold, and his fingers were numb.

Jarril looked at his wristwatch and staggered to his feet. The pep-tablet would carry him on for a while, and if his calculations were correct—the concept of doubt over his calculations was sickening—he ought to reach the settlement. There must have been some deeper physiological damage that he had not been aware of. The thought disturbed him. Evaluation of events. Choice of the best procedure. The lessons so hardly learned hammered at him—and he was blindly falling down on this job, which might well be regarded as a graduation exercise.

He ploughed on through the red sand, feeling the chill eat into his thick boots and up his legs. He eased the equipment on his shoulders and went rigid with shock to find Garfon's stuff still there. He was well below par! He still had hope. That was something that must be inculcated into every guardsman; that little extra bit of go which could pull a guardsman out of a tight corner. He had hope, all right. He was no automaton, no robot, no

creature who worked without emotion. But his emotion was channelled and directed and fully under the control of his intellect. That had not been one of the easiest lessons, either.

His hope made him look ahead for lights of the settlement. When he saw only blackness ahead, with the driving sand whipping up in the growing wind, there was no reaction of despair. That was an emotion that could be done without. And the Academy knew how to eradicate unwanted emotions. He would have to dispose of Garfon's equipment at once.

Beneath a convenient ridge, with the sand, now only a dark and inchoate mass streaming off the top and whispering and pattering away beyond, he set the unwanted equipment down and stood back, his face a sweat-glazed caricature, with sand plastered thickly to the exposed skin.

Deduction told him that the growing sandstorm must also be responsible for his lack of strength and concentration. Dust and sand streamed past him and hissed steadily over his coveralls. His goggles were caked up, the wipers stalled, and irritably he took them off and cleared them with one numb finger. A few shrewd blows of his foot sent a tumbled pile of sand and rocks to cover the little heap of equipment. Without a second look he bent his head and struggled on.

At first, the faint beep of his mentalarm passed unnoticed. Then he roused himself from a hazy reverie of the Academy and long sessions under the oaks, to find himself rapidly evaluating just what was happening.

Some entity was approaching. Somebody, some human, was coming closer towards him in the storm. Through the drumming shriek of wind and the flying hiss of sand he could not be expected to hear any footfall or even motor sounds. Jarril sprawled under the lee of a ridge and brought his hand-gun out, partially protected under one coveralled arm.

When the battleship had been fatally hit by the Sok-

kath scouts and plunged towards this system, there had been no time to run the ident cards on planets, and so Jarril and Garfon had shot away in their lifeboat and crashed here with no knowledge of what conditions would be like.

But Jarril had expected a humanoid culture.

He allowed a tenseness to hold his body taut and steady his gun hand. Peering through narrowed eyes, to fine the focus, he lay very still as the thing approached.

A shambling, half-seen monstrosity that swayed and dipped through the flying sand. Four-legged—of that he was sure. Long legs, with large knee joints. A thin neck and a head like an obtuse spade. An excrescence on the back, which might well house the brain and therefore be the prime target. The thing was obscured most of the time by sheets of sand and dust: but Jarril sighted his weapon and waited coolly until the very last second. The Academy had very soon drummed into the entrants the truth that the man who fired first lived to tell about it.

The swelling behind the head shifted now, as though endowed with some obscene independent life of its own, and flowed and ran. Jarril remained calm. He had been led to believe that whilst most of the explored sections of the Galaxy were known to be inhabited by humanoid peoples, any outre form of life was theoretically possible. And since the ship had been operating outside the known limits of Terran expansion—he was facing his first real alien.

Then the impossible truth of the situation forced itself on his tired mind. His mentalarm had operated on the humanoid level! This thing, whatever it was, had a mind pattern comparable with a Terran's!

Jarril eased the pressure on the trigger.

The obscenely-flowing lump on the alien had shifted now, had swung forward and down, and Jarril involuntarily drew back the gun again under the last fraction of pressure before explosion.

He saw in that last desperate instant that the alien had now two excrescences on its back, smaller and less pronounced, and then his gun went off almost unnoticed.

The flare of energy lashed out, and quite distinctly Jarril saw it lance in a beam of fire past the alien's spade-shaped head. Then, through the growl of the storm, a voice boomed, angry, frightened and full of invective.

"What in blazes do you think you're doing?"

And then, to Jarril, came the strangest event of all in this bizarre ten minutes. He found a peace, a kind of mental aloofness, imprison his brain. Somehow he knew that it was completely unnecessary to fire his hand-gun again. He stood up, the gun hand dropping to his side, and moved out from behind the lee of the ridge.

At once a hard human hand had gripped his upper arm and an angular body had bundled him back under the ridge again. In that second he had felt the full force of the wind and the thousands of flying blades that sported in the wind, the teeth of the desert, ready to choke and strip and blind.

"All right, son, take it easy." The voice was human, rich and throaty, and just now sounding very dry and rasping. Jarril saw that the man's head was almost fully enveloped in a shapeless hood-like garment, with only one opening from which peered a pair of brilliant goggled eyes.

"Who——" Jarril began.

"Save it. Nasty storm coming up. Here, make yourself useful, if you want to. Grab this sheet and haul it over both of us." The man leaned out into the torrential tide of sand-strewn darkness and pulled a heavy cloth sheet towards him as though he were a conjuror producing objects from a hat.

"Sam!" the man bellowed, his voice rising briefly above the breath of the wind. "Sam!" A dark, monstrous form bulked inwards, and, even in the rushing wind, Jarril caught a whiff of strong, stomach - turning odours. He caught an edge of the sheet and pulled it over

him, hunkered down, trying desperately to evaluate the position—and failing lamentably.

"What's up, son? Never seen a camel before?"

"A camel! Yes, that is, no." Jarril clamped his teeth together to stop their chattering, and then forced himself to say calmly: "I've seen tri-di's of them. Who are you?"

"Name's Foster, son." He broke off, and Jarril felt the sheet above them tauten as Foster lashed out backwards with one heavy arm. "Get down there, Sam. Confound the brute, he's let half a ton of sand down my neck."

The cold was now intense, as cold, almost, as that training trek they'd carried out on Mars. Here, on this unknown planet, with a gravity and atmosphere comparable to that of Earth's, the sand and debris of the desert cut in with double the force that it had on Mars. And, to add to his discomfort and misery, he had no oxygen equipment, no mask to cover and protect his face. Only the goggles, and with a grunt of resignation Jarril remained quiet as he realised that the wipers had stalled again.

The man who had arrived on his camel was moving around again. Jarril could feel the sheet pull, and a trickle of sand sluiced off the edge to be caught and whirled away into the chaos of howling blackness. Something metallic and warm thrust itself against his hand and he felt Foster's breathing against his face.

"Drink this, son."

Obediently, Jarril drank. Hot tea. Spiced with something else that he could not identify, but which made him gag and splutter.

The violence of the storm was numbing and soporific. After a time it seemed to Jarril that there had never been any other existence apart from this huddling under a sheet in the lee of a sand ridge, with a barely-seen camel blocking the down draught and an unpredictable stranger lying with slow and even breathing at his side. He felt disinclined for conversation. It was a struggle now to make oneself heard, and

the shrill of the wind and the scuttling hiss of the driven sand filled the belly of the night with madness.

How long he lay there, Jarril never really knew. He remembered fragmentarily that he had wanted to sleep; but every time he was about to drift off, his senses warmed and carried him away on a shining cloud of forgetfulness, the stranger dug a hard and unromantic elbow into his ribs.

The coming of dawn and the dropping of the wind coincided. Jarril refused to accept what his senses told him; the roar and crash of the storm was still battering at his ear drums, and the slither of sand from the crest of the ridge was still a nervous overtone to the general bedlam. He heard Foster say something, and shook his head, dislodging a shroud of dust which made him choke.

"All right, son. She's blown herself out. We'll just take a little breakfast and then get straight back. You can do with a long session of shut-eye."

The fact that Jarril could hear Foster's words quite clearly convinced him that the storm must be over. He licked caked lips and pushed the sheet back. There were tremblings from his stomach, a vacuous gulf that weakened him and against which he had to fight.

Jarril said abruptly: "You haven't asked me who I am and what I'm doing here."

"That's right, son."

"Well." Jarril was nonplussed. "Do you usually find strangers wandering around out here in the desert?"

"Nope. I saw that firecracker of yours come down yesterday, so I kinda thought I'd mosey around and have a looksee."

"It's just as well you did, Mister Foster. If you hadn't found me it was a ninety-nine per cent. certainty that I would have died out here."

"Could be." Foster stood up and shooed his camel away from the banked slope of sand that stretched beyond what had been the ridge. "What sort of talk is this ninety-nine per cent. stuff? I'd say you hadn't got much of a chance at all."

Jarril winced at the loose phraseology. This man was a civilian, unable to evaluate problems with the cold logic of Spatial Academy, and therefore a person with inferior mental powers and of a lower intellectual order.

"I owe you my thanks for my life, Mister Foster," he said formally. "Now I must reach your settlement at once and use your radio."

"We'll get there," Foster grunted, opening bags and boxes which were slung from the camel's back. He ripped the lid from a thermo-can and handed the can to Jarril. "Here, drink this, and get rid of the shakes. And you needn't call me Mister Foster all the time. Most folk just call me Foss."

"Thank you, Mister Foster," Jarril said, sipping the hot coffee-mixed porridge. "I shall see that you are adequately rewarded by Terran Space Navy as soon as I can contact them."

Foster lowered his own half-opened can and stared at Jarril.

"Now look here, son. I don't know who you are, and I don't particularly care. And I'm forgetting that I decided that somebody might need help after that rather heavyish landing and came out here knowing that a storm was blowing up. But there's no call to insult me by talking about rewards." Foster finished opening his breakfast-can with a strong twist of lean fingers, and his face was dark and anger-lined.

"I had no intention of insulting you, Mister Foster." Jarril felt anger at the waste of time in wrangling about petty abstract matters. "I am an officer of the Terran Space Navy. Lieutenant Jarril, at your service."

"Well, finish your breakfast and then we'll get back to the settlement." Foster was abrupt.

The camel lumbered to its feet, almost seeming to rise section by section, and Foster, casually tossing his empty thermo-can away, took the lead rope and began to walk off. Jarrill looked for a moment at the lean upright back and the proudly-erect head, now freed from the enveloping hood, and decided

that Foster would have made good officer material. As it was, it was too late, and a good man had been wasted.

A number of events had occurred, and their need for evaluation and correct grading occupied Jarril during the journey to the settlement. The walk was not long, and Jarril was easily able to persuade himself that it was not necessary for him to commandeer the camel and ride—as was his right—whilst Foster walked ahead leading the animal. Jarril tried to detect a flaw in that line of reasoning, and obstinately refused to see any. He decided that it was not yet necessary for him to carry out a self-analysis. Time enough for that when he reached the settlement.

The overlarge sun rose in the sky, and the temperature rose with it. Jarril was sweating by the time they slid down the last dune and saw the settlement come into sight. The settlement was in fact just an oasis, a tiny speck of human life clinging on around a water-hole.

If Jarril had expected some sort of reception, he was mistaken. The huddle of concrete domes and metal huts, scattered haphazardly around the central plaza, where the well shaft was surmounted by a small motor and driving belts, remained silent and unresponsive.

Foster had lit an old pipe and Jarril moved out of the range of its reek.

Foster grinned.

"With me, son, it's a case of Sam or the pipe. I kinda get along better with the old rascal if I don't smell him all the time." He took a long drink from his water-bottle and spat. "I'm going for a wash, and then I'm going to sleep a spell. Want to come along?"

"Thank you, Mister Foster, for your hospitality," Jarril replied as though speaking to the Commander's lady after a dance. "As I said, I must send a message immediately to Terran H.Q. Can you direct me to your radio station?"

"Surely. That'll be old Ben's dome. Over there, the one with all the washing hung out on the aerials."

Jarril looked in the direction indicated by Foster's pointing pipe-stem. Washing. There *was* a line of clothing and bed linen hung out, and it *was* hung on a radio aerial. He swung back on Foster.

"What kind of settlement is this, anyway? Where's the Governor, or Mayor, or whoever is in charge?"

"We don't have anybody like that," Foster said. He put his pipe back into his mouth and slapped Sam on his yellow hide. "If you want to send a radio message you'll have to see old Ben."

Without another word Jarril strode off towards the concrete dome surmounted by the radio mast, dust flying in angry spurts from his black boots.

Jarril refused to let his mind dwell on the spectacle of the washing hung out on radio aerials.

It might be an idea to have the Navy take a look round this planet. The fact that it was outside the sphere of Terran influence made it of curious interest to Earth. If the Sokkaths found the planet first, and were able to set up a base here, then that would be a reverse in the Galactic game of chess that strewed smashed ships and broken men among the stars. Jarril knocked on the metal door.

When he had waited for five minutes with no answer to his repeated knocks, he pushed the door open and blinked in the dimness within. A dog growled at him from a dark corner, and as his eyes adjusted Jarril saw that the room was empty of people. The dog growled again.

Going back outside, Jarril saw a woman round the corner of the dome and come towards him, struggling under the weight of two cans yoked across her neck. In three strides Jarril covered the intervening space and took the yoke and cans away, carried them easily to the dome's door.

"Thank you," the girl said simply. "You must be the man Foss found out in the desert last night."

"That's right. How did you know?" Jarril wiped one hand across his forehead, pushing the mentalarm up. "It doesn't matter. I must

send a radio message immediately. It is of vital importance to Earth. Do you know where the owner of this radio apparatus is?"

"My father? Oh, he's gone off on a desert-lynx shooting hunt. Half a dozen of the men have gone. Should be good hunting weather, right after a storm like this."

"Yes, yes. Who else is there around that I can——"

"My father is the only person who owns a radio here that can send a message to Earth." The girl picked up one of the cans and unclipped it from the yoke, and went in the dome. "Come in and I'll fix you something to drink. It's always dry weather around here, whatever else happens."

"You mean that this is the only radio?"

"Surely. Why should we need two?"

"Well——" Jarril fumed. "Look, in a case such as is happening now, I must send this message. I'll have to use the equipment myself."

"The door's locked."

The girl nodded to a partition walling off the rear of the room, at right angles to two other walls behind which were presumably sleeping quarters. The door was loosely fastened with a large and antique padlock.

Jarril smiled.

"I don't call that door locked. Why, even a child could get in there."

"Of course. It stops the dogs, though." The girl busied herself at the stove, and soon Jarril wrinkled his nose as frying bacon sent palate-tickling odours circling in the room.

This whole affair had the quality of a nightmare. And Jarril didn't believe in nightmares—they were strictly for the maladjusted. He had come through Spatial Academy with one hundred per cent. Some little backwoods settlement would certainly not step between him and his duty. He crossed the room determinedly, stood before the padlocked door.

"I wouldn't open that door if I were you," the girl said casually. "But if you have to, I guess you have to."

"The Galaxy is at stake, miss," Jarril said stiltedly.

"I'm afraid that I cannot wait for your father to return." He put one foot hard against the door, and it went inwards with a tearing of metal. Inside he found a switch and produced a light which showed him the radio equipment. He grunted and sat in the operator's seat.

Old and antiquated, but it should reach Earth.

He switched on and waited whilst the set warmed up. These people must have an atomic converter around, probably sited somewhere beyond the circle of huts out in the desert. Thick cables drooped into the dome's interior, and he had seen other cables trailed loosely around the spaces between domes outside. And yet Foster had been using a camel. Jarril shrugged that off. First things first. Deal with items in the order of their importance.

The radio set refused to work.

JARRIL methodically checked the circuits with a meter he took from a dusty shelf and at last found a single valve that had blown. He removed it from its socket and looked around the bare walls for any sign of a replacement. Amongst all the bric-a-brac of a radio shack he found a couple of dozen valves and resistors, none of which were of the required type.

He went out into the living-room and found the girl calmly eating her breakfast at a white-polished plastic table. She gestured towards a second cup.

"Tea?"

"Thank you, miss." Jarril showed her the valve. "Where can I find another valve like this?"

"Daddy has some in a box over there, under those microtapes."

When Jarril had pawed through the rubbish he began to feel his irritation gnawing at his overstrained nerves.

"I'm afraid that the sort I require isn't here, miss," he said. He picked up the cup and drank some tea.

"Oh, don't call me miss all the time. My name's Claire. I'm sorry about the valve. Won't the radio work?"

Jarril didn't answer. Instead he drank some more

tea. It was good, sweet and strong.

"Well," Claire said, flushing. "You might be able to buy one at the store."

"Where is that?"

"The other side of town. Jikko runs it, and he's mostly got what we want in stock." She smiled. "But I'd wait until the men get back from their hunting."

"Thank you for the tea, miss—Claire," Jarril said. "I'll find this store and be right back."

He went out into the sunshine, and now he could hear the shouts and laughter of children at play. The motor atop the well whined, and a group of gaily-clad women were chattering and gossiping as their water-cans were wound up. This society was an atrocious blend of modern and ancient. A honking came from behind and he leaped agilely into the shelter of a hut doorway, his hand going to his gun, as a three-wheeled car purred past, dust spreading lazily from its balloon tyres. He shook his head, feeling the mentalarm press down round his forehead as the heat of the sun made wearing it gradually more and more uncomfortable.

He was about to take it off, secure that here there would be no Sokkaths, when his ingrained training halted his half-raised hand.

The mentalarm shielded and filtered off thoughts, cast a blanket of force around the electrical activity going on inside the brain. With the mentalarm removed, the Sokkaths could pick up a human brain like a beacon in the night. And no-one was absolutely sure just how far a Sokkath could pick up human thought impulses. It was, he computed with a wry moue of distaste, a hundred per cent. certainty that he should keep the mentalarm on. But it was damnably hot.

As he walked rapidly through the little town he noticed that there seemed to be little work in progress. Everybody he passed seemed intent only on having a good time; they paid him scant attention and none bothered to speak to him. That was odd; but in some stupidly-strange way it fitted in with

the character Jarril was beginning to assign these people. The fields that spread out from the town edges, carefully irrigated by automatically-pumped canals and encroaching on the baleful preserves of the desert, were all deserted. Industry was at a standstill. He passed a short row of metal huts with open fronts, inside which he could see machines ranging from primitive potters' wheels to induction electronic furnaces. They were all idle.

He had already noticed the bizarre clothing affected by nearly everyone. There seemed to be no norm, no standard type of dress, nothing by which to measure what state of affluence these people considered essential. The concrete domes had obviously been sprayed on balloons, the metal huts were standard erections similar to any to be found on Terran-occupied planets; there was nothing unusual there.

Here, he saw with surprise, a man go past wearing khaki shorts and shirt, with a black, shiny and well-brushed top hat firmly wedged on his head. Another man had a pair of white tennis slacks and a brilliant scarlet waistcoat as his only other item of apparel. The women seemed to favour beach dress and bathing costumes. All in all, to Jarril, growing every moment more uneasy and annoyed at his own uneasiness, it looked very much as though he had landed in a lunatics' colony.

The concept brought a grim frown to his lean face. It might very easily have been some interstellar accident that brought these people to this planet in the first instance, and as a result of the shock to the brain structure of the first settlers, all their descendants were impregnated with the seeds of madness. The idea did nothing to alleviate Jarril's disturbed state of mind.

Cutting across a small open plaza which led off the main square with the pump, he was arrested by a growling snarl and turned in time to see a toddler standing with one hand outstretched to pat the head of a shaggy and dust-caked mongrel. The

youngster could not have been more than three years old and was completely naked.

Jarril watched, caught, despite his sense of urgency, by the content of drama in the puzzled, curious and stockily-insistent youngster, determined to find out what this brown animal thing was. The pudgy fingers went out again to the dog's head, and the dog drew its lips back over yellowed teeth and growled deep in its throat. The kid might get bitten. Jarril stepped forward, with some half-formed idea of shooing the dog away, when a woman came from the shadows of a dome, her hands and arms white with flour.

Stopping his movement and feeling awkward and embarrassed—the woman was wearing only an apron tied round her middle—Jarril realised that his intervention was no longer required. This casually unattired woman was the boy's mother. He turned to resume his way towards Jikko's store, and the woman said: "I wouldn't touch that dog, if I were you, son."

The boy stood for a moment, hesitant, and the dog growled again, ominous and throatily. Jarril, his mind going out again to the Galactic happenings which he knew he must immediately report to Earth, halted and watched. The youngster paid no attention to his mother. He stepped forward, and his pink hand found the dog's head, stroked, and evaded with uncanny deftness the vicious snap of yellow teeth. The dog bunched itself, snarled and then snapped again. This time the youngster wasn't quite quick enough, and the shining teeth clicked on his hand.

Jarril was in action by then and his heavy boot landed soggily in the hound's side, sent it yelping up the alley. As the dog disappeared behind one of the domes an irate man bounded out, waving a chess-piece in his hand.

"Leave my dog alone, sir! Who do you think you are to come here kicking other people's dogs?"

Jarril had the youngster's hand in his own, was sifting

sulphur-powder into the teeth-marks. The kid wasn't crying, he saw, and that fact alone made some crazy sense out of the bedlam that erupted around him. The woman had not moved after she had warned her son.

"Pipe down, pop," Jarril said roughly. "If your dog is in the habit of biting children then it must be destroyed."

"I told sonny not to touch it," the woman said unexpectedly. "He won't touch that dog again."

"What sort of mother are you?" demanded Jarril. Before he could receive a reply the youngster had darted away from him, running inside the dome. The old man with the chess-piece shook it under Jarril's nose, laughed, and said: "I'm an old man, son. You must expect me to have a little fight still left. Which reminds me: I've Danny's queen forked. He'll lose a game rather than lose his queen."

With the disappearance of the boy, and now the rapid retreat of the old man, Jarril was left facing the woman. He noticed the strength of her limbs and shoulders, and realised that all these people were well-built and healthy. There was none of the malnutrition and half-starved struggle for existence so often found on frontier planets.

"Where do you get all your food, ma'am?" Jarril enquired.

"Grow some," the woman answered unconcernedly. "Buy some from traders. Why?"

"Well—that is, oh, just thinking." Jarril walked away quickly, amazed at his own chaos of thought. It was high time he carried out some searching self-analysis. He felt there was a forty per cent. chance that he had suffered some deeper physiological damage when the lifeboat crashed; he had been too quick to blame his below par activity onto the sandstorm.

The trouble was that he was up against something, something here in this settlement, that he could not rationalise. He couldn't get to grips with the situation. There was no clear-cut obstacle, the answer to which

he could logically evaluate and form a definite conclusion and pattern of action.

He kicked at the packed sand of the walkways between the domes. The quicker he sent that message and regained the calm sanity of the Navy, where people reacted as expected, the better. The calmness that he knew as a matter of routine was completely unlike that compelling blanket of quietness that had enveloped him out there in the sandstorm when he'd fired at Foster and the camel. That sense of well-being, of rightness about the universe, had been with him and grown stronger ever since he had entered the town.

Jarril stopped abruptly, and his hand went jerkily to the mentalarm encircling his forehead.

What had got into him? Was he cracking up, losing his capabilities?

He was worried about his own brain emitting impulses which might be picked up by the Sokkaths — when all around him were people transmitting their own impulses broadcast. He had not seen a mentalarm in use, nor expected to, in view of the Galactically-known fact that only the fighting men were so equipped with the expensive little gadgets. Disgustedly, Jarril pulled his mentalarm off and folded it, thrust it into his pouch. His head felt freer at once.

He resumed progress, and this time there was another itchy little suspicion floating around inside his head.

Whatever these people were like in actuality, he was forming the suspicion that they were nothing like what they appeared to be. Anyway, all those sorts of questions were purely academic beside the urgency of sending the message to Earth. When that had been done he could, if he wished, spend a little time analysing these people and finding out just what lay behind all the amazing paradoxes of their way of life.

Finding Jikko's store was not difficult.

There was a weatherbeaten board outside, sand-scoured and warped, with a shakily-painted legend : "Jikko's." He pushed on the metal door and

almost bumped his nose when it refused to open.

Irritated, he knocked.

Not again, Jarril almost moaned aloud, not another damned interruption. He looked around. Here the town was thinning out, the domes were farther apart, and through the gaps he could see the ring of green fields encircling the encampment, barring it off, as it were, from the hungry tide of ochre desert beyond. One or two people were crossing the small open space, and Jarril called perfunctorily to one of them, a young man in a pair of shorts.

"Hey, you! Where's Jikko?"

The youth did not stop. He looked back over his shoulder and said: "Gone hunting." Then he vanished behind a metal hut.

Jarril stood for a moment, not really believing what had happened. Some filthy little civilian being downright rude to a Space guardsman! Jarril ran quickly round the metal hut, caught the youth by one arm and whirled him round. He glared into the other's face.

"When I ask you a question I expect a civil answer! Now, quick, if Jikko's not here who else can open up the store?"

The young man looked down at Jarril's arm. Jarril released him and stepped back, and then, as an afterthought, dropped his hand lightly onto the butt of his gun.

"Well, I'm waiting!"

"If you'd asked me that before I'd have told you. Jikko's nephew can open up."

"Well, where is he?" Jarril breathed deeply. "So help me, if you say he's gone hunting, too, I'll——"

"As a matter of fact he's just coming to the store now."

Jarril looked back and saw a short, stocky man with a curiously wide face and small, oddly-shaped ears, about to enter the store. Without a "Thank you" Jarril left his informant and sprinted across to the store.

The short man looked up at the sound of Jarril's running footfalls.

"Open up quick," Jarril snapped. "I need a valve, type——"

"Hey, hey," the other interrupted. "Not so fast. Jikko's away hunting today. I'm afraid you'll have to wait."

"Now listen here." Jarril controlled himself with an effort. A distracting singing hum had begun in his ears, and he was trying to determine whether it came from an outside source, or from inside his own head. "I'm a Terran Space Guardsman. I need this valve for some fool's radio set the other side of town. You'd better open up and get it quick."

"Suppose I did open up—and I can. I'm Jikko's nephew and in charge when he's away—can you pay me for the valve?"

"Pay? I'm requisitioning it."

"I don't know about that——"

"Come on man, stop bandying words. Move!"

"H'm. Well, I'm going to take a crowd of kids on a picnic out into the desert, so I won't have time to get the valve. Even if Jikko authorised this requisition that you speak of. Even if we had the valve. Anyway, the store's shut."

Jarril bunched his fists in a tightly-gripping knot.

"You were just going in."

"Can't a man change his mind?"

"Listen to me, Mister Jikko's nephew——"

"It's no good arguing, Mister Terran Space Guardsman. You'll have to wait until Jikko gets back for your valve. And if you've been monkeying with old Ben's radio set, then I'd look out for trouble when he gets back to town."

Feeling as though he were losing a solar system in a Galactic war-game, Jarril dug down in his pouch and produced a handful of Terran currency notes.

"Here——" he held the notes out. "Take what's due and get me the valve. And hurry it up!"

"I'm sorry, mister. You can't get anything from the store today."

"Why not?"

"Today's Sunday."

To Jarril, that was about all that he could take.

He pushed Jikko's nephew to one side, drew his hand-gun and blasted the metal door down in one fiery gout of energy. He was kicking the remaining shards away whilst they were still hot. He went into the store and began to paw over the lined shelves.

The short man put his head through the opening and said: "Well, mister. I warned you. I sure feel sorry for you when Jikko gets back." Then Jarril heard his rapid foot-steps as he walked off.

To hell with them, Jarril cursed, and went back to throwing things from the shelves into the centre of the store.

He found a cupboard full of valve cartons and rapidly selected the type he needed. Going out, he methodically left a Terran Space Navy requisition voucher alongside the cash register, filled up with the figure stamped on the outside of the carton. The sun was hotter still as he went back towards the radio.

Going through the central plaza, he noticed that now the people stared at him as though he had staggered into town carrying the Black Plague. He cursed them again and tilted his water-bottle. It was empty.

The motor still whined atop the well, and Jarril turned towards it, pushed his way through the women standing around. They made way for him readily enough, and he tried to ignore the scantiness of their clothing. At that, it was hot.

A water-can had just reached the top of the shaft and a woman reached forward and unhooked it, swung it dextrously around without waste of effort, and clipped it onto the yoke on the back of another woman.

"Can you spare me a bottle full of that water, ma'am?" Jarril asked respectfully.

The woman looked at Jarril with steady eyes that made him uncomfortably aware of his youth. "Surely," she said quietly. "Help yourself."

When his bottle was filled, Jarril said: "Thank you, ma'am." He left the central plaza hurriedly, not quite cer-

tain how to take the women's attitude. Then the enormity of that hit him.

What would his tutor at the Academy have said could he have known Jarril's complete loss of evaluation recently? Jarril was sweating now. If any of this episode leaked out when he was back with the Navy—well, goodbye promotion.

The damnable thing was that he had been behaving with an unpredictableness that was confusing in its very irrationality. A guardsman—a guardsman as good as was Lieutenant Jarril—should not behave as he was now. There was this singing in his ears. There was this peculiar business of being unable to get to grips with the people of this settlement. And there was, perhaps most important of all, this business of the calm, the feeling that everything was all right, that had pervaded his mind ever since he had met Foster out there in the desert.

Through that fatalistic sort of feeling he had occasionally been able to strike out with his normal personality. As when he had blasted down the door of the store. He shook his head. There was a rhythm to it all, a sort of recurring pattern.

The girl telling him not to monkey with her father's radio. The woman telling her child not to touch the dog. Jikko's nephew warning him about the store.

"The hell with it," Jarril said thickly. He almost ran the rest of the way to the radio dome, and saw with an almost comical relief that the girl was taking down the clothes. Assuming that she had put them out at daybreak, they would have dried by this time.

Jarril cursed again as his fingers fumbled the job of putting the valve in its socket. Then he had pushed it home and switched on.

This time the radio worked.

Claire came to the door of the radio shack, a wiping-up cloth in her hands, putting a polish on a glass.

"I hear you caused a little disturbance over at the store," she said matter-of-factly. "I like you. I wish you wouldn't

go around stirring up trouble."

"Keep quiet," Jarril barked "And go away! I've work to do."

"All right." Claire sounded perfectly composed and not at all hurt by Jarril's brisk tone. "If you want to create trouble, then I suppose you will. It's a pity, all the same." She went off, shaking her head.

Confound the girl! It was difficult enough to find the correct operational sequence of this antiquated jumble of equipment masquerading as an ultra-light radio set without having a girl preaching all over the place. Jarril plugged the headphones in and flipped the switch to send, cutting out the characteristic hoarse croak that filled all ultra-light transmission.

"Calling H.Q. One," he said. He repeated that for some time, without giving any sending identification, as was laid down in the regulations. Working by code, by the law as given in the books, was a peaceful relaxation after the incoherent madness and irrationality of the culture into which he had been pitchforked. With this regaining of his normal way of life for a few moments, with this fresh contact with the things he knew and was capable of evaluating properly, Jarril found that other, that strange and uneasy sense of well-being, that very suspect sense that everything was all right, faded and dimmed, and with that decrease throwing up in stark relief the fact that everything was very far from all right.

He tapped impatiently with a blunt pencil on the panel, waiting until the light came on that would tell him that someone out there, unimaginable distances across the light years, was answering his call.

When the red light flicked on, Jarril was seconds slow in his response, and had sent his call out again.

He knew what that would mean.

He cut in the two-way communication, and over the guttural grumbling of ultra-light the distant station called out strongly, the voice echoing in the tiny radio shack.

"Earth H.Q. One here. Answering your call."

"Lieutenant - Guardsman Jarril. Terran Space Navy. Have urgent report on location of Sokkath battle fleet."

"All right, Lieutenant. You were late in your answer. This has been noted in your records. Give your own estimate of your below par activity ratio."

Jarril's mouth compressed and he forced himself to say: "No data on amount below par. I repeat, I have an emergency battle location report."

"Proceed."

What they were thinking back on Earth, Jarril did not care to dwell on. That he was working below par he now knew he must accept. But that he did not know, even approximately, how much, would be almost the ruination of him. Almost. He mentally cursed his own loose phraseology, and then had to admit that he could not evaluate just how much trouble all this would bring him. The concept came that it was all outside the scope of his experience. That, of course, was blasphemy. What could be outside the scope of his experience, fed as that had been at the Academy? There they taught cadets from the wealth of experience of centuries.

"Lieutenant Jarril! Are you there? Proceed at once!"

Jarril muttered a curse, licked his lips and began to relate the destruction of his ship and the crash of the lifeboat. He was brief about the death of Garfon; it was not relevant, and had just reached the point in his narrative where he had entered the settlement, when the voice that blasted from the speaker froze him in horror.

"Lieutenant Jarril! We are not interested in your autobiography. What is the battle-fleet location you have? Give the information at once!"

He hadn't told them the vital news that he carried!

Jarril lowered his head on his arms, sick and wondering and full of a black feeling that he could not understand. It couldn't be despair, he hoped; he did not know what

despair was. It had been bred out of him back at the Academy.

He gave the Sokkath battle fleet location, times and course vectors, concisely and rapidly. Then he waited for instructions.

"Where are you now?"

Jarril shouted through the half-open door of the radio shack.

"Claire! What's the name of your sun? And what planet is this?"

Whilst Claire was answering, his own mind crawled with the shattering concept that he had failed to find out this information before. He just couldn't understand what was the matter.

"The sun is Aurea IX," Claire said, coming to stand just inside the door. "This is the fourth planet. We call it 'Earth'!"

"I am on Aurea IX Four," Jarril said into the microphone. "Instructions as to course of action."

"Keep quiet and keep alert. Do not call out again. For your information and data correlation, the Sokkath battle-fleet you have reported will shortly be engaged by the second Terran battle-fleet. We will pick you up after that. Probability of your rescue within two Terran days is eighty per cent. Evaluate from there. A full transcript of this highly-irregular transmission will go into your records. Get yourself back to one hundred per cent. efficiency, Lieutenant. Good-bye."

Jarril didn't even bother to reply.

Claire offered Jarril a cigarette. He refused, and looked his astonishment, tinged with disgust, as she put one in her mouth and lit up.

"You are old-fashioned, Jarril," she laughed. "Haven't you ever seen a girl smoke before?"

"No. To smoke reduces one's efficiency."

"I enjoy it." Claire puffed a streamer of blue smoke from pursed red lips. Jarril noted the soft lines of her cheek and the way her hair curled gently around under her ears. Then he looked away. Women were not for guardsmen. Claire said:

"What are Sokkaths, Jarril?"

"You mean to tell me you don't know?" Jarril was honestly bewildered. He was under the impression that everyone in the Terran sector of the Galaxy knew who the hated aliens were.

Their conversation was interrupted as a voice called from outside the front door.

"May I come in, Claire?"

"Surely, Foss," Claire called in her lilting voice that Jarril found disturbing. He repeated to himself that women were not for guardsmen. Foster ducked in through the doorway, and said: "That young hell-raker has really been stirring it up. The men have abandoned their hunting."

"Oh!" Claire gave a quick little bird-like twist of her head in Jarril's direction, and then she laughed, a rich, vital flood of golden sound. Foster chuckled dryly.

Jarril rose from the chair before the radio, the movement serving to give him back some of his lost ascendancy over any situation in which he found himself. He forced his mind to blank out the weakness expressed by the necessity for physical action to exert his authority. The two settlers stopped laughing, and Jarril said woodenly, his own voice remote and reed-like in his ears: "You seem to forget that I am a Terran Space Navy guardsman. I have a duty to perform. The whole Terran sector of the Galaxy is dedicated to the winning of the war. If necessary I shall put this settlement under martial law, and I assure you that it is a hundred per cent. certain that I can maintain that situation alone. Don't ever forget that I am an Academy-trained guardsman — you should know what that means."

Claire was looking at Jarril, and so missed the sudden thinning and sucking in of Foster's cheeks. Foster looked, all in a flash, years older.

"I don't pretend to understand all you say," Claire said. "You were telling me what are Sokkaths."

Jarril, caught momentarily off balance by this shift in the trend of ideas, delayed his reply, and in the expectant

silence Foster's low groan of anguish sounded clear and distinct, like a graveyard elm groaning in the wind.

Claire rounded on the older man. "What is the matter, Foss? You look dreadful."

Foster waved her words away and stared at Jarril.

"You were talking about wars, son," he said slowly. "And you mention the Sokkaths." He groped for a chair and sat limply, shrunken. He spoke again, in a whisper that Jarril had to strain to catch. "Will they never learn?" Foster said. "Why are the fools so blind?"

"Foss!" Claire's voice was sharp and tinged with that elemental fear of the unknown. "Foss! Tell me—what is the matter?" She shot Jarril a hot glance of contempt and hate.

"It's all right, Claire, dear," Foster said at last, taking one of the girl's hands and stroking it absently. "Just that we are being caught up at last in the great, bloody, grinding w h e e l s of the Galaxy. Well," he sighed and shook his head, "it had to come, I suppose. But I wish it hadn't come in the shape of a young whippersnapper who worships a black uniform and a weapon of destruction."

"If you are referring to me," Jarril said icily, unmoved by the spectacle of the old man's shattered confidence, "I would like to remind you that I am a Terran Space Guardsman ____".

"You've said that already!" Claire flared out. "If I were you I'd get out of here before the men get back from hunting. You and your Sokkaths both!"

"Just a minute!" Jarril almost shouted, distracted, feeling his head reeling under the impact of that damnable singing that had increased during the last bitter exchanges and now buzzed in his head like an unleashed neucleonic-converter. "Just a minute! Am I to understand that you do not know who the Sokkaths are or that Earth is engaged in a life-or-death struggle with the hated aliens? Answer me that, at once!"

Foster looked up, and the gleam in his eye gave him the appearance of an aged and mystic fakir, fasting on his bed of nails.

"I know who the Sokkaths are, son," he said quietly. "Claire doesn't—nor do many of our people here. What I didn't know was that the fools on Earth—and on Sokkath for that matter—have eventually perpetrated the final idiocy and begun a war that can end only in both their civilisations' complete destruction——"

"This is a just war, a war of liberation——" Jarril began, and the wild singing in his head mocked and derided him. He clapped one hand to his forehead and felt the sweat run thick and sleazy in the heat. He clawed desperately at his Academy training, trying to evaluate the position and failing miserably through lack of data. Foster cut in, his words dripping despair.

"The men will be back from the hunting very soon now. The matter of your destruction of communal property can be passed over in the light of the new and futilely stupid information you bring us."

Jarril brought out a thought that had been troubling him for some time.

"How is it," he asked, his words sounding as though he were speaking through a mouthful of mush, "that here you are, living in the uncharted space between our sector of the Galaxy and the Sokkaths, completely without mentalarm shielding, and the Sokkaths haven't yet paid you a visit?" His words grew wrathful as he voiced the suspicions that had accumulated like foul acids in his mind. "I think that you are in league with the Sokkaths! I think that you are all traitors to Earth!"

"Oh, don't be silly," Claire said annoyedly. "I told you we call this planet Earth, even though we know that the real Earth is light years away. Wouldn't we call it Sokkath, or something like that, if we were renegades? And after what you've done to poor Foss I think you'd better go before the men arrive."

"Don't worry," Foster said.

"He'd better stay now and we can thrash this matter out. If we are to be overrun by war, killed, raped, butchered and burnt, then perhaps we'd better find out what we can of the general situation outside our own system."

"You haven't answered my question," Jarril said.

"Of course we're not traitors to Earth. But we don't believe in war. Your mind shows that you have been trained in only one thing. You have brought an unease, a sewer-stench, an irritation into the commind ever since you arrived. But, naturally, we helped you. That was our only logical course of action. You are a thinking man, even if a warped and twisted mind, and the commind demands the best from each unit."

Jarril didn't follow that at all. Before he could carry on that train of conversation he heard a heavy tread outside the dome and simultaneously the facts of Foster and Claire lit up with a joyous inner fire and the singing craziness in his own skull deepened and thickened, and he nearly blanked out. Jarril struggled to remain conscious, his breathing hoarse and ragged and his mouth open, gasping, and sweat ran down thickly from his face onto his chest.

Men came into the dome. Men with hairy chests and strong, sun-burned arms and faces. Men with nets and horns, with running shoes and shorts and precious little else. All their faces were calm and serene and carrying an obvious overtone of dominance and power.

Jarril felt as though he were being throttled.

"Daddy," Claire said, then compressed her lips.

"Hi, Foss," the leader of the newcomers said, his voice grave and calm and yet flecked with a richness that hinted at a way of life completely beyond Jarril's powers of comprehension to understand. "Having a little trouble?"

"Not so much trouble, Ben," Foster said, his voice normal and full. He straightened up, and the fire came back to him and he seemed to have forgotten the hunched

wreck that he had been a moment before.

"Not real trouble. Just that those damned fools back on Earth have finally tangled with the Sokkaths and they're fighting themselves fit to bust all over the Galaxy."

Old Ben pursed his lips, and the other men muttered uneasily, then they all fell silent and their eyes seemed to Jarril to recede, to grow bright with some inner contemplation and their faces grew rapt and intense. He imagined that some force stirred his hair. The room was suddenly utterly still and silent.

Then the singing hum in his mind grew and spun and broke itself into little hard shards of thought that shattered against the very core of his being.

Lieutenant-guardsman Jarril, of the Terran Space Navy, toppled unconscious to the floor.

HE came round to the cool bite of some liquid on his tongue and spluttered and spat. Someone was holding his head up and the floor was hard and uncomfortable under his body.

"Take it easy, son. Relax. It always comes rough at first."

"What — always comes — rough — at first?"

"The commind. Forget it for the moment. We've got a lot to ask you and you'll have to recover a bit before then."

Foster was speaking, a Foster that was unlike either of the two other Fosters that Jarril had known. This new Foster was not the man who had rescued him in the desert, laconic, unpredictable and altogether outside the scope of Jarill's experience. Nor was he the man who had sat hunched up on a chair and keened over the death throes of a Galaxy.

This Foster was clear-eyed, buoyed by an inner experience that gave the onlooker the desperate desire to partake of that experience, to share whatever source of godhead had given a mortal man that sure conviction and steady fire of purpose. Jarril shook his head and groaned. He felt awful.

He found himself lying on a soft, rubberised bed, with a smooth, plastic ceiling curving away, following and covering the harsh concrete dome. Claire was sitting in a basket chair alongside the bed. He flicked his eyes towards her and she smiled and her lips moved.

"We've tried to organise something for you, Jarril. I must apologise for the way I treated you. It was unpardonable. I have been very humble within the commind. I think that other emotions must have made me act the way I did towards you." Her soft eyelashes closed and Jarril could have sworn she was blushing.

Old Ben moved into the focus of Jarril's eyes.

"How long has this war been going on, son?"

Strangely, Jarril made no attempt to assess the value of that question. He didn't even worry about evaluating the probable result of his answer. It didn't matter that it could make no difference to the state of the war whether he told this man the truth or not. The character-shaking fact was that he hadn't made any attempt to evaluate the position.

"Four years," he said through puffy lips.

"Not too bad, then. Are you in a fit state to listen to a little history, son?"

Jarril nodded.

Old Ben drew up a chair and, to Jarril's weak feeling of disgust, lit and puffed up an old pipe.

"Long time ago," Ben said meditatively, "a crowd of folk back home on Earth got around to thinking about the war mentality. They thought that there must be some reason in a person's mind that made him—and millions like him—go off to wars and kill and lust in the killing. Some little quirk in the synapses or cells or even, if you'll pardon the term, in the spirit. So these folks got together, they and their wives and children, and came here."

"So it wasn't an interstellar accident," Jarril said.

"No, son. We chose to live here. And the desert fitted in with our plans. Only a very few Terrans, or Sok-

kaths, have been here, and one look at the desert convinced them they didn't ought to stay. We have a regular ship trading into one of Terra's outer frontier planets for food and equipment and such. But that must be obvious from our supplies that you have already seen."

"I'd gathered that. I had an idea that you might be trading with the Sokkaths." Jarril felt stronger, and the singing in his head was only background now, like the hoarse rumble of ultra-light.

"We do," Ben said surprisingly. He held up one brown hand and went on speaking. "We adopt the same attitude to the Sokkaths as we do to Terrans. Live and let live. Now to get back to the original settlers who came here: they decided to live a way of life that was completely free of all petty bickering and quarrels and to open up their minds to the better things of life. They cast aside all restraints and inhibitions. Of course, that took time; but once the second generation was coming along, the progress increased out of all proportion."

"That explains your queer dress and Foster's camel."

"That's it. You're getting the idea. Do just what you want to do and let the next fellow do what he wants."

"How about farming? And work? And keeping the wheels turning?"

"We held on to a Social Conscience, son. Don't think we're a bunch of anarchists. If a nasty job has to be done, then someone will always be around to say: 'I feel like doing that.' It works out if you keep your Social Conscience in perspective."

"How about your conscience when it comes to the cowardly attack on Earth by the Sokkaths?"

"I've already said that these early settlers believed all wars to spring from some maladjustment in the human brain. The same holds true of Sokkaths. If we could only free our minds of all the petty worries and fears and prejudices—no more wars."

"So?"

"We found that the Sokkaths attacked Terrans by

tracking the emanations of the human brain. They had an uncanny ability of recording the brain impulses, by using equipment rather like the electroencephalograph known and used from primitive times on Earth. Only they were capable of picking up the brain rhythms from immense distances. We believe that they could trace the Theta rhythms rather more easily, as these denote a search for pleasure and a frustration and longing, typical attributes of the selfish, childish, warring and antagontistic mind."

"You make it sound very interesting. The only trouble is that I know most of that—in a slightly different form, true. We of the Space Navy use mentalarms to blanket our brain impulses——"

"I know. A clumsy and inefficient system. Think of the feed back."

"Yeah," Jarril acknowledged gruffly. "We get headaches. But the mentalarm works!"

Old Ben gestured irritatedly, and cuffed a cloud of smoke from before his face.

"Let's not get heated up over the relative merits of the mentalarm or other trivia outside the scope of what I'm telling you. The fact remains that the Sokkaths track human brainwaves—and they track the waves that are representative of hate and antagonism and intolerance. In fact, Jarril, the brainwaves that you emit in your everyday life they can pick up like a single tree in the desert, the emanations that combine to form the war-complex."

"So I was trained for war. So are the Sokkaths. What difference does it make what sort of rhythms your brain emits? The Sokkaths can pick them up if they're not shielded."

"To backtrack a little," Ben said, shifting around in his chair so that the encroaching shaft of sunlight fell short of his head. "The early settlers here strove for the sort of even, smooth mentality that would have no petty bickerings, no festering grievances, no primeval fears of existence—no ulcer culture, if you like—to prove that if a man's mind was

freed from these impediments he would become a whole man and free from the war-complex."

"That sounds like a lot of idealistic moonshine to me." Jarril felt prisoned in the soft bed, so unlike the rigid bunks in cadet barracks. He stirred restlessly and then sat up, throwing back the bedclothes and pulling his wrinkled coveralls down with a deliberately precise movement. He needed to think things out. And whilst this oldster was yapping away about a bunch of misfits who'd run out on civilisation and refused to shoulder their due obligations in the war, he found it impossible to concentrate. The enormity of that percolated his senses gradually. He, who had been trained to think quickly and efficiently, to evaluate any given situation even during the turmoil of spatial battle—upset and off-balance by the prattle of some feeble-minded old crank.

Apparently these people had been here for some time—at least four generations, to judge by Ben's remarks. They'd left civilisation behind them. What was it Ben had said: "The ulcer culture?"

A nice phrase—but meaningless to a space guardsman.

Outside, he could see an edge of the red packed sand serving as a path. A little wind was throwing up whiffs of dust, and he thought he could almost see the shadows moving. Time was running out. Two days, they'd told him. Two Terran days and the Navy would be here. Jarril looked across at Ben and Claire sitting silently watching him.

"What happens now?" he asked, a rougher edge to his voice than he'd expected.

"Does nothing of what daddy has told you mean anything to you?" Claire asked. Jarril found a deeper sense of embarrassment in the intensity of her tone.

"Should it?"

"You asked us why the Sokkaths hadn't molested us," Ben cut in, with the echo of a sigh. "Don't you tie that up with what I've told you? That they couldn't track us by using our brain waves, as the waves we emit just don't

register on their equipment? Or is all that too fine a thinking for your vaunted academy brains?"

"Now, daddy," Claire said reproachfully.

"We might all think in a freer and saner fashion now, Claire," Ben said stiffly, but with a twinkle peeping from his eyes. "But that doesn't mean to say that we can enjoy stupidity, even if we tolerate it."

Jarril stood up, his hand automatically feeling for and adjusting his handgun. Surprisingly—to him—it was still belted to his waist.

"I think you'd best listen to the rest of the story, son," Ben said quietly. "You've only heard what can be called the preliminaries. The commind is still to come."

Before Jarril could utter the stinging remark that boiled from his overstrained nerves, a mounting thunder sifted down from above and he could immediately make out the characteristic throttling roar of a small trading type spaceship.

He felt the ground tremble beneath his feet and then the ballooning cotton-wool effect of the silence as the ship's drive cut. It couldn't be the Navy. They wouldn't come in a trading ship and, anyway, they'd said an eighty per cent. probability of arrival in two days. That was too high an estimate for them to arrive this fast.

Although—if Earth had lost the battle that had blown up out in the great void—any type of ship that came for him would be more than welcome — and totally unexpected. If Earth had lost; Jarril recoiled in himself at the loose phraseology. He became aware that old Ben was speaking.

"That'll be the trading ship. Due around now, day sooner or later. Hope they've brought some of my tobacco. I'm running low as it is. Claire, just pop out—and, oh, it doesn't matter. Here he comes now."

On the heels of Ben's words a stocky, leather-clad individual ducked in the dome, closely followed by Foster and another settler. All their faces were tight with repressed emotion. Anger?

Bitterness? Apprehension? Jarril couldn't know; but he caught the immediate increase in the tension in the little, domed room.

"Ben," the newcomer began without preamble. "Just seen the damnedest sight you ever saw. Looked as though space itself had boiled over. What a mess!"

Nobody spoke, and the leather-clad man went on speaking.

"Bumped into a real life-size battle on the way across. Caught surges of it in ultra-light, and as the old boat's not as sprightly as she used to be I thought I'd better come out and check. Believe me, I got back into ultra so damned fast I must have used the same warp."

Jarril could follow that all right. This man and his cockleshell had stumbled right into the battle raging out there between the second Terran battlefleet and the Sokkath fleet.

"Could you catch any details?" Jarril asked sharply.

"You kidding?" The newcomer half turned towards Ben. "Who is this character, anyway?"

"Some soldier or other who's been spreading darkness and distortion around. Surely you've sensed it?"

"That wasn't called for, Foss," Claire broke in suddenly. "Can he help it if he's been conditioned all wrong ever since childhood?"

Jarril let all this pass by. He was hungry for information, for the feel of the great game played among the stars, if only from the lips of a civilian who wouldn't understand the smallest fraction of the whole beauty of it.

"Never mind all the wisecracks," he said, with authority riding his voice. "Tell me, fellow. Could you describe something of what you saw? Even a ten per cent. accurate description?"

"Believe me, brother, I got out of there so fast I nearly hit my backblast going in."

"I'd be interested to hear something about it, Landau, if you feel inclined to talk," Ben said smoothly.

"We—ell," Landau said, pulling at his leather jacket. "I did notice that a crowd of

ships that weren't ever made in Terran yards were heading hell-for-leather in a direction that would have taken them right over my head." He added sarcastically: "That was one of the strongest reasons for my somewhat hasty departure."

"That could mean they were heading in this direction," Jarril said hollowly.

"Could be," Landau said without interest.

At this, the man who had entered last, an individual Jarril noticed who had peculiarly-shaped ears, uttered his first words since coming into the dome.

"Well, now we've heard all that newsy stuff, Landau, suppose we get around to finding out just what you've brought us this time?"

"All right, Jikko," Ben said comfortably, lolling back in his chair and reaching for his pipe. "Time enough for that later. Right now," he went on in a changed and hardening voice, "we have the pretty little problem of a Terran Space Guardsman in our midst, scattering most definitely unfriendly thoughts around broadcast, upsetting the commind by the simple method of pouring sand in the works. And we have a Sokkath battle-fleet, which ordinarily would never know of our existence, coming—as Landau puts it — hell for leather for us."

"You mean," Claire whispered, and her mobile face grew rigid and whitened beneath her tan, "they'll be able to trace us, now that Jarril here has brought in his disturbing mental radiations?"

"Just that, Claire."

Silence grew in the dome, and Jarril broke it with a physical effort that brought the beads of sweat out in a pimpling rash across his forehead.

"All right. All right. You don't have to worry about that at all. This commind you seem to worship has the capacity for concealing itself from the Sokkaths? Right? And the state of mind that results in the commind is something that can be examined, analysed, duplicated and put to work. Put into action for Earth!" Jarril's

eyes were shining and his breathing had quickened. He could see it all. Ships of the Navy, crewed by integrated groups of Space Guardsmen, working together as one combined whole, their minds attuned and razor-sharp, capable of incredibly rapid manœuvre and synchronisation, carrying the war into the Sokkath's backyard.

"What are you talking about, boy?" Old Ben's rumble underlined the abrupt hissing of indrawn breath from Foster and the strained, incredulous expressions of the others in the dome.

"Just that here you have developed the perfect weapon to win the war for Earth!"

"You don't know what you're talking about. The commind cannot be ordered about, it cannot be simply brought into existence at the flick of a finger; you have to adapt your own way of life——"

"Don't try to preach to me now. Not with this tremendous possibility dropped right into my lap!" Jarril casually unlimbered his hand gun and moved away from the door, putting everyone else in the room in front of the cold gun muzzle. This was action that he understood. Here were none of the hazy imponderables and metaphysical concepts that had been so freely bandied about lately. Here was a job that he was supremely fitted to perform.

"Right. Just keep your hands away from your bodies and start walking. You five will do as a start. If we can't pry the secret of the commind from you, then we'll come back here and scrape up a few more of you misfits." He gestured with the gun and the others rose, obediently, unhurriedly, their faces on a sudden clearing and losing the dragging lines of strain. They did not speak. In silence they all left the dome, began to walk slowly across the red-packed sand towards the rocket perched stumpily out in the desert beyond the ring of cultivation.

Jarril had no reason to sum up the situation as being too easily solved. He was used to enforcing his will, if necessary with a gun in hand.

This was old stuff to him: a situation that might have come straight out of the Academy training manual. The only unsettling element was this damned commind. He did not fear any physical attempt on the part of these neurotic people to stop him before he'd shepherded his prisoners to the rocket and taken off. But there was a nagging little doubt at the back of his mind. He gripped the weapon until the ridged butt bit into his palm, and looked carefully about. He might not be working at a hundred per cent. efficiency, but he was so close now as not to worry about what fraction he might be below par.

"Why it had to be people like you who discovered such a tremendous weapon I don't know," he said, finding comfort in the familiar vibrations of his own voice. "But when I get you back to Headquarters and the commind is broken down, analysed, data compiled and the first ships from Earth go out to the stars equipped with a crew who can call at will on the services of a commind of their own—then I imagine that I shall not be Lieutenant Guardsman very much longer." He chuckled. "It's a hundred per cent. certainty that I'll be a Commander Guardsman. A fifty per cent. probability that I shall be a Captain Guardsman. I think I shall like that."

Still the little group of people walking slowly and without trepidation towards the stumpy trading rocket had not spoken and, as though in a dream, Jarril herded them up the ramp and into the coolness of the ship's interior. With the abrupt cutting off of the sun he shivered, then shook his head angrily and gestured the others to climb up into the control room. They obeyed silently, wooden-faced, without any of the natural reactions that Jarril expected and was on guard against.

Then, so shockingly that Jarril swung his gun erratically from one figure to another and his nostrils flared and trembled with reaction and tightly-drawn nervous readiness, old Ben spoke.

"Try." That was all, just the one laconic word.

Jarril knew that old Ben was not speaking to him. Before he could sort out the position or try to draw any sort of conclusion, he saw a boil of human figures spreading out from the domes and huts come running towards the rocket through the green, cultivated fields. Little figures with waving arms and empty hands and open mouths crying words that were lost in the still air before ever they reached the people high in the rocket's nose.

Jarril looked down unemotionally, summing up the situation and deciding on the next step. He was familiar with the rocket's lay-out and knew precisely where the few weapons were housed. He looked calculatingly at the running people outside, seeing them grow larger as they came nearer, take on recognisable features and personalities.

Was it necessary for him to burn them down?

Probably not—they could not harm him inside the ship, nor could they prevent a take-off. On the other hand, the more people left here in this isolated settlement the better he envisaged the functioning of the commind would be. There was the Navy-instilled thought that it would be good for morale and discipline if he burned some of them. Then perhaps, next time, the survivors would be more co-operative. That would be acting according to the book.

Jarril's hand moved slowly to the red firing knob, and he sensed, without having to look, the t e n s e n e s s grow among his five prisoners. He refused, even then, to look into Claire's eyes. Nobody said anything.

Let them be. They were not really worth his bothering with. His job was to take this incredibly valuable cargo of potential commind instructors back to Earth. Jarril punched the firing studs and simultaneously he felt within his head a swirling vortex of pressing thought, sweeping out and circling idiotically, so that every nerve and function of his body was stilled and held suspended.

Even as he saw the firing patterns on the board and knew that they were heading out into space, that vice-like feeling, as though his head was held immovably between two clamps, crushed in on his consciousness. He dropped his gun. He staggered back, tearing at his coverall pouch for his mentalarm which he remembered putting carefully away there when walking through the town.

Long before he could withdraw it he saw on the screen stars whirling and dancing, a spreading wash of light that seeped into space where no such light should be and then, with such a shock of revulsion that his body twisted in involuntary muscle-response, came that familiar crackling feeling of the commind. This time Jarril struggled to prevent himself from blacking out. He fell forward against the control panel, hands grasping for support, brushing the cold metal, knowing that he must hold on through this mental torture and bring the captives to Earth. He had to. He had to take the secrets of the commind to Earth: not only so that the war could be won for Earth, but to recapture his lost efficiency and to prove that he was fit for the rank of Space Guardsman.

That light in space where no such light should be grew brighter around him. The cold, smooth metal of the control panel grew warm. Warm and rough with the gritty, webbed surface of concrete. The light grew ruddy.

Something smooth nestled itself into his palm and, stupefied, he looked down, saw through a roaring mist that his hand-gun in some impossible way had leaped from the floor and socketed itself back where it belonged.

He looked up.

Inside the dome the five people were standing regarding him with an emotion that he felt subconsciously must be that of pity. He was leaning against the concrete dome, with the rectangle of sunlight from the door washing over him and glinting from the plastic ceiling covering.

This was sheer, stark insanity.

"Sit down, Jarril, and take your time," old Ben said quietly.

Jarril obeyed. The latex-rubber bed felt good. He put his hand down and pushed, then laid the gun down carefully beside him. The monstrous thought occurred to him that the weapon was of no further use.

He was inside the dome, back in the settlement. But a second—an age—before, he had been guiding a rocket up and out into space to take the secrets of the commind back to Earth. He shook his head. Just for the moment it was all beyond his power to analyse.

"Listen to me, son," old Ben went on, speaking in that sympathetic drawl that triggered some response from Jarril's obscure past before he was at Academy. "You've just been through an experience that might have turned a weaker mind than yours. I was telling you about the commind and then you had the idea that you could treat it as a physical object and decipher it and put it into use with your Space Navy."

Foster chuckled dryly and Jikko's forceful snort of derision passed almost unnoticed by Jarril. He was trying to find the inner strength to look at Claire.

He had failed. It was quite simple. He had no further right to the title of Lieutenant Guardsman.

"The commind," old Ben was saying, waving his pipe abstractedly whilst his keen eyes searched Jarril's face with the desire, Jarril felt suddenly sure, that he wanted the younger man to understand something with more than just his intellect. "The commind is a product of the p a r t i c u l a r circumstances which were set up here by us. It is impossible for any duplicate to exit where there is the slightest vestige of the ulcer-culture. Can't you see, son," he said vehemently, "the commind can control illusion. I told you we could blanket out our thoughts so the Sokkaths would not track us. We can also create the illusion of open desert here should any ship we do not wish to contact search us out."

"What about Garfon and I?" Jarril said dully.

"Your ship? We knew you were in distress—Foss went out to help you. The illusion of desert can be held for as long as we wish—the illusion of anything at all is possible to the commind."

"So that was what—I see." Jarril couldn't feel any emotion now. "You allowed me to think I was taking you back to Earth aboard the rocket. It was all an illusion. Why?"

"We tested you, as well as letting you see the power of the commind. You did not burn the people who ran out from the settlement. Whatever you may have thought your reasons were, the fact is you didn't burn them. There still lies something that can be salved in that mind of yours. Deep, though. Very deep, under the meretricious philosophy instilled into you at your Space Academy."

Jarril's mind was fogged, like the coiling vapours that ooze upwards from dank heathlands, and he had a feeling of emptiness, of sickness in the stomach, at the conception that the Academy could be wrong. Surely—surely, he struggled for belief, surely the discipline and tradition of centuries was not founded on a quicksand of lies and half-truths?

"It would seem that—that there is a basis of truth in your claims," Jarril said. He knew how inadequate that was, but he still had a struggle to say that, even. More, just now, was beyond him.

Foster moved forward, with Jikko at his side, and old Ben nodded his head, sending the smoke from his pipe writhing in blue streamers like temple incense.

"I know," he said, "we still have the problem that the commind is not functioning fully as an integrated unit owing to the presence of Jarril. We were able to master the illusion that Jarril had taken command of the situation and marched us out of here, even that he had fired the rocket. That was relatively simple, taking into consideration the nearness of the individual, the fact that there was only one, and the abnor-

mal sensitivity under which he was functioning. However, the Sokkath battle fleet is another matter. They will certainly spot us."

Jarril said: "What about my mentalarm?"

And with that question he knew that the last barriers were down. He actually accepted what these people had to say about their culture. As to the commind—well, he could see quite clearly now just what that was. Hadn't he felt the singing hum in his mind, growing until shards of thought burst inside his brain, knocking him unconscious? Hadn't he been completely deceived by an illusion so real that he'd actually felt the bite of his gun-butt and the sun on his neck? When a group cast off all their former primeval inhibitions, when they attained to some exalted personal state wherein there could be no petty jealousy, no bickering, no festering animosity, then it was the next logical step to assume that from that group unity of consciousness a truly group mind arose.

With all the Academy training serving as a background of integration, of preparing to work one with another smoothly and with no friction, Jarril could quite clearly see the implications of a freed mind.

It was a sort of super-entity.

And he had experienced it two ways. From the outside, subjected to its dominance, when he had been under the illusion. And from the inside, if only for a tiny span of time, just before he had blacked out.

And, because he had come unheralded and unwanted into this tightly-organised community, he was about to betray it to the enemy. And the Sokkaths, he knew with sombre foreboding, would attack savagely and without mercy, destroying the settlement with one obliterating sweep of their weapons as soon as they picked up his brain impulses.

He looked around for his mentalarm, which he remembered he had tried to draw from its pouch during that hallucinatory period. Pulling

it out with fingers that trembled, he gave it one look, and let it droop laxly from suddenly helpless hands.

When he had fallen during his black-out he had landed squarely on the pouch.

The mentalarm was smashed beyond repair.

"You see, son, it looks as though the deck had been stacked against us." Old Ben puffed evenly on his pipe and for the first time in his life Jarril had no inner disgust at the bite of the fumes. All the disgust he had now was directed inwards—at himself.

To hell with Academy training for all its one hundred per cent. efficiency—he had recognised something in the commind and the way of life of these people that he had yearned and sought for through all the lonely years of his rigidly disciplined existence.

"Isn't there anything we can do?" Jikko asked, his eyelids twitching. "Anything at all?"

"It doesn't look like it, does it?" Foster said carefully.

Claire said: "Can't we . ."

Her father nodded. "I think so. Of course, he's chock full of all the wrong ideas and notions and as friendly as a starving desert-lynx. But we might be able to do something. At that, we might," he added reflectively.

"What are you driving at?" Jarril felt supremely humble. Like a child lost and alone in the unfriendly dark. "So I realise that I've been wrong all my life. Is that easy for any man to accept? Can you really comprehend what it means, even if you think you do? What do I do now? For God's sake, you're not made of stone. What is going to happen to me?"

"Isn't it obvious?" Jikko said roughly and unexpectedly. "And to think of my store front! Oh, well, it's our skins, and we have as much aversion to frying as you have, son."

"You'll have to take it rugged," Foster said. "I told you the commind is always rough at first. Even to us, and we're born to it."

Ben took up the conversation where it had died when Landau had entered, a seem-

ingly endless time ago. "Briefly," he said, turning his pipe over in his hands meditatively, "the early settlers saw dimly what could be achieved. Second generation children furthered that work. To-day, we have a truly group consciousness. We are above all the things that drove our ancestors here, away from the ulcer culture. Through free will, channelled only by our Social Conscience, we have attained a greatness of spirit that is as far above the ancient Nirvana as is a modern space battleship from a primitive coracle."

"I — see," Jarril said uncertainly. His head was aching.

"It's only because the commind has such inner strength now that a newcomer can be adjusted at all. Without your co-operation, it will be impossible, anyway."

They all sat then for a long moment, quiet and relaxed, in strange contrast to the vividness of their previous clash of wills. The whirling hum that had been for so long background noise in Jarril's head grew and swelled, and again he had that shocked impression of fragments of thought thrusting themselves at the edges of his mind.

Before he blacked out the confusing swirl of thought impressions grew to an intensity that he had not dreamed could be contained in the universe. Then, quite quickly and unobtrusively, they faded and were gone like morning mist before the risen sun.

Old Ben chuckled with that dry, vellum-rustling laughter that made Jarril's mind grope backwards to the fire-place of his youth and the comfort of home life that he had voluntarily forsaken when he'd donned the Space Navy black. Old Ben said: "Just remember, son. There's an old saying that covers this situation pretty thoroughly. Rather, there are two old sayings that are apropos of the current set-up." He laughed briefly, with some humorous contortion stemming from his subconscious that he alone could appreciate.

"This is going to hurt me

more than it hurts you, Jarril," old Ben said. Then the fiery clash of mental forces burned and scorched in Jarril's mind. He glimpsed vast and hazy concepts rising like mammoths on the dawn of the world, sheeted in ice and gleaming with the frosty hand of truth. He saw, clearly and with the scales all fallen away from his mind, what truly he—and his comrades in the Navy—had been. Garfon, for all his phlegmatic acceptance of death in line of duty, and all the rest, were wrong and misled and purely animal-like in their lust for destruction. It didn't come easily. Jarril's mind felt as though it had been wrenched inside-out and forced through a mincer. He came back to an awareness of his surroundings to see his companions—his true companions now—sitting exhaused, and tasted a staleness, a flatness in the air of the dome.

"I accept your words," Jarril said in a choked voice. "I believe. I truly see that to attain to any greatness of spirit I must strip myself of all the petty bitternesses and animosities of the past. But it will take time—and I feel as though each breath is my last. Can you tell how near the Sokkoths are?"

"Near enough." Foster pulled his own pipe out and fondled it, then put it away. Claire rose lithely and produced frosted glasses with the ice forming linked chains of patterns on the thirst-quenching liquid. Jarril drank deeply.

"Can the commind function?" Jarril asked.

"I think so," Ben said. "Jung talked about a collective unconscious. Those facts that are really race history, preserved in every individual's unconscious mind. The term, you might think, Jarril, is diametrically opposed to what we are trying to attain here. But the commind is not really a collective consciousness—it is far above that, as I have told you. The race history that we all possess must first be cleansed, the dark animal drives must be washed away, and the emptied spaces used for our new, saner concepts of the universe and the position of man

in the world in which he lives against the background of the universe. The struggle for your mind is nearly over. You have gone through a process that is analogous to what we go through during our years of maturing and growth. It has not been easy, I know."

"You don't have to tell me it hasn't been easy," Jarril said with a flash of his old spirit. "Is there more?"

"A little." With the words the outside world dizzied and span and Jarril was plunged into the maelstrom of inner conflicts and feelings, his very hold on the precepts of life by which he had lived wrenched away. He knew the final humility of realisation that one's own id is of micro-importance compared with that of the race's. And the whole human race is of no importance, except to themselves, in the scheme of universal progression.

Claire was holding out the re-filled glass to him and he drank thirstily. She smiled, and something in her eyes leaped and responded to the unspoken words in Jarril. He touched her hand, the flesh cool and smooth and very comforting to him. Then he twisted round and found Ben standing by the door, face upturned to the sky.

"It's all right, Jarril." Ben looked back into the dome, blinking his eyes from the glare outside. "They've gone. The Sokkaths have ploughed on their imperious way, as they wish to do. Now we can get back to normal."

"Thank God for that," Claire said, and smiled at Jarril.

He sat up abruptly.

"Now, just a minute." He paused, feeling the inner something about him that had changed. He knew that he had believed what Ben and Claire had said, what they stood for, before he had been treated—if that was the right word—by the commind. That wasn't it, either. The commind had no factual existence. It was just the embodied character of these people here, the distillation of their feelings, channelled by their own precepts and adherence to what they considered the right way of life. "Now

just a minute. I see that you consider that now, because I've been a good boy and seen eye to eye with you, that I'm one of you now."

"Jarril!" Claire's shocked voice rang in the dome. "Jarril! What do you mean?"

"I mean that you expect me to say 'Thank you' and then to settle down here."

"Of course. You can't go back to Earth now, not with the feelings you have. You know what they'd do to you as soon as you were found to be changed from what they'd made. Jarril! For my sake! You've got to stay!"

Jarril looked for a long while at Claire. The immediate danger from the Sokkaths was over. He had no feeling of animosity towards them; he could evaluate their position quite well. Earth was just as much to blame for the war as was Sokkath. But that was quite a different thing, and something that now did not matter.

What he had to decide was what should he do now? Quite obviously, Ben and Claire — especially Claire — expected him to stay with them, settle down, become one with them in the commind. The prospect was very alluring. It seemed, at first sight, the only possible solution to his problem.

"What's troubling you, son?" Ben was re-lighting his pipe, and the sweet palate-tickling scent of the tobacco was pleasant on the air. "I'd say that your best bet was to stay with us here. We've quite a life to offer."

"Sorry, Ben." Jarril walked over to the door and stood looking out on the domes and red dust and green cultivated fields of the settlement. "There could be a good life here for me. But there's one thing you've overlooked. Sure, I've realised the error of my ways. Sure, I know what the other old saying was that you mentioned. 'It takes two to make a quarrel.' But, you see, with all this purging of my character and personality, I'm still me. I'm still Jarril. And I still have a sense of duty. I want, more than anything I've ever

wanted, to stay here with Claire. More, perhaps, than you'll ever realise."

Claire gave a stifled sob and ran to Jarril, folded herself into his embrace, her head on his chest. Jarril, tight-lipped, smiled down, hating himself for doing this to her and yet seeing no other way.

"When the rocket leaves for the frontier planet, I'll be on it." Jarril had difficulty in speaking. "I'll do what I can to hasten the end of the war. I can keep in contact with you; the commind will see to that. But you must realise that there is little one man can do."

"Don't go, Jarril." Claire was sobbing, straining her man to her with arms that would break before they let go.

"I must do what I see is right. You have taught me that. If I had been just an ordinary sort of person, without the experience of the commind to buoy me up, then I should no doubt very easily have been able to stay here. But I must do what I see is right."

Gently, so as not to hurt her too much, Jarril freed himself from Claire's grip. He walked away, through the door, towards the rocket.

"I'll wait on board," he called back. "It's best that way. One day, I'll be back." He turned, just before he entered the airlock. He waved one arm.

Then he had gone.


## *Great New Competition*

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*A mathematician's reply to our recent competition article*

# THE EXPANDING UNIVERSE

by Professor Delwood

In the June issue of *Authentic* Mr. Puttick claims that the Expanding Universe is not a proved fact but is only a theory. He gives his reasons why it should not be true. We will not go into the errors of his reasoning. Suffice it to say that there *is* a proof of the expansion of the Universe, a proof simple enough for readers of *Authentic* to follow without difficulty. Any amateur scientist who wishes to debunk the expanding universe must first of all pick holes in this proof.

Rat-tat-tat-tat go the drums in the African jungle with exactly quarter second intervals between the taps. No matter how far you are away or how long it takes the sound to reach you, you will always hear the same rhythm and the same quarter second intervals between the taps. For however far and long the sound of the first tap takes to reach you the second tap takes the same route, the same time, and remains a quarter second in arrears. If you should hear the taps so that the interval is greater than a quarter second it can only mean that the sound of the second tap took longer to reach you than the first. This could be because you are moving away from the drums, or the drums are moving away from you. Or perhaps the velocity of sound is decreasing with the cooling of the air in the evening. But some such explanation of the slowing down of the second tap must be found.

A musical note, say a whistle, is a vibration at a frequency depending on the pitch. You can regard the pulses of compression in the same way as the series of taps. The frequency may be 1,000 instead of four a second. If you hear a lower note than

the whistle is producing, then either you must be moving away from the whistle or some other explanation must be found.

Light also is a vibration, the pulses being electromagnetic fields. The colour of the light depends on the frequency. If the colour of the light you see is more red than the light emitted, then either you are moving away from the source or else some other explanation must be found.

An excited calcium atom sends out light of a fixed monochromatic frequency. Actually there are more than one band, but we can distinguish them and it is enough to consider one band only. All calcium atoms give exactly the same frequency. If we look at a star 1,000 light years away we recognise this calcium band but find that it is displaced towards the red.

Only two explanations are possible. Either all the calcium atoms in the star are vibrating more slowly than they do on Earth or else we are seeing the light at a lower frequency than it had when it was emitted, a thousand years ago.

Taking the first explanation, it must follow that all the calcium atoms situated on the surface of a sphere a thousand light years radius, and a thousand years ago, were vibrating with a certain frequency slightly slower than the ones that we are accustomed to here and now. They could not have this property by virtue of their position in space unless we are prepared to admit that the solar system occupies an extremely privileged position, at the dead centre of this sphere, and similarly at the dead centre of similar spheres of varying radii. We must conclude that the atoms were vibrating because it was a 1,000 years in the past. Ten thousand years ago the decrease in frequency was ten times as great, and so on. A few thousand million years ago one single vibration would have taken twice as long as it does today.

This is one possible explanation. It is the explanation of the late Professor E. A. Milne in his theory of Kinematical Relativity, as the measurements would be according to his $\pi$-scale.

If, however, we do not assume that the atoms vibrated more slowly in the past, then it necessarily follows that we are receiving the pulses more slowly than they were emitted. Of two consecutive pulses, the second takes longer to reach us than the first. The simplest explanation is that the distant star is moving away from us. It would follow from observations that all distant stars are moving away with velocities proportional to their distance.

But if Mr. Puttick or any other amateur scientist wishes to dispute this universal recession the onus is upon him to give an alternative explanation for the delay of, say, the second pulse as compared with the first. A slowing down of light in transit would not explain it, for both pulses would be slowed down together. Except perhaps if it is assumed that all light is continually getting slower. This would imply that a few thousand million years ago the velocity of light was 372,000 instead of 186,000 miles a second. It seems rather less plausible than an expanding universe.

Thus the proof of the expanding universe really does exist and is almost watertight. The alternatives of continually accelerating atoms, or of the continual slowing down of light, are not real alternatives. They are different ways of regarding the same phenomena, depending on how your chosen units of length and time vary as the time passes.

The proof is almost, but is not absolutely, watertight. An explanation of the red shift could be found which leaves the universe static. Perhaps *Authentic* readers would try to test their ingenuity to find a flaw in the reasoning. Next month I will deal with that flaw.

**Very ordinary things they are today, but they were the—**

# *Hidden Treasure of Kalin*

by E. C. TUBB

THE room was small and damp, heavy with the combined odours of must and mildew, of stale air and staler filth. A vaguely rotting smell, a mingling of wet and dry, of rancid fat and reeking hides, of mould and human odours, of dirt and slow decay.

The walls were of rough stone, windowless, laced with heavy beams and plastered with crude mortar made from mud and manure. The roof was low and blackened with smoke, sweating with damp and sending little rivulets of moisture trickling over the stained plaster. Rough boards formed the floor, uneven, the bark still clinging to their gaping edges, a few skins doing little to stop the gaps. Rough, too, were the cupboards and chairs, the one great table and the row of shelves, all made of hand-hewn timbers, crudely fashioned and primitive in their utter lack of design or artistry.

A door pierced one wall, its gaping planks resting on sagging hinges of mouldy leather, and a hide curtain hung over a group of shelves. Books rested in neat array on the splintered surface of the wood; books with crumbling pages and covers soiled and blotched by damp and age.

Books with thin yellow pages and disintegrating bindings; books with hard covers and some with long-vanished paper. Outside the door an armed guard kept constant watch, and others stood ready in the street below.

For this was the treasure house of Kalin.

At the table an old man sat reading by the guttering light of a single wick floating in a bowl of fat. He squinted as he read, holding the faded paper close to his watery blue eyes, his matted white beard stirring as if with inner life as he painfully mumbled the words.

*". . . the intermediate frequency amplifier, a diode valve, is incorporated in the circuits, and this is supplied with voltages at the intermediate frequency. These are . . ."*

He sighed and set down the book, rubbing his weak eyes and frowning at the damp-stained wall.

"Frequency?" He shook his head. "Diode? Circuit?" He mouthed the words with painful care, repeating them as a man would repeat the meaningless words of some ritual, and the guttering flame flared briefly, throwing writhing shadows crawling over the time-stained pages of the book.

Outside the sagging door the guard rasped a harsh challenge, was answered, and the door scraped open to admit a young man. Like the other occupant of the room, he wore a coarse, toga-like garment of filthy homespun. Crude sandals were lashed to his naked feet, and a matted fleece was slung over one shoulder. He, too, was bearded, and as he walked he trailed his left foot crookedly behind him.

"Good day, Reader," he said respectfully, and set down the wooden bowls of stew he carried. "How comes the work?"

"Slowly, my son." The Reader dipped his spoon into the stew and began to eat

with noisy relish. "This is good."

"Tharg killed last night." The Pupil sat down and joined his master in the noisy meal. "A deer he slew on the brow of the hill. The village eats today."

"It is well."

For the rest of the meal both men ate in silence, their bone spoons dipping from wooden bowl to bearded mouth with steady monotony. Finally the old man belched, wiped his mouth on the back of his hand, and stuck his grease-smeared spoon back into a pouch which hung at his belt.

"News, Pupil?"

"Kalin the King is ill, and it is thought that he will die. Kalin the Warrior hunts towards the caves of the Hairies. Smuth bewails his dying son, and Jon fears for his crops. There is much murmuring."

"So?"

"They say that Kalin is a fool to retain so much treasure when there is so little food. They say that our portion is too high, and that too many men do nothing but guard the Books. They say that is wrong."

"*They* say!" The old man sprang to his feet and glared at the boy. "Kalin the Warrior says, you mean. Kalin the son of the King who will be King himself ere long." He slumped back in his chair and stared at the shelved books with sombre eyes. "For as long as we know this has been the treasure of Kalin. When the Gods punished men for daring too highly and flame shattered the Golden Towers, our ancestors came to this place and built this village. Slowly they gathered in their treasure, a Book here, another there, trading for some, going to war for others, until we have what we have. We must guard that treasure, Pupil, for there is not another like it in the whole wide world."

"As you say, Reader, but I have heard whispers . . ."

"Of Books?" The old man

leaned forward with a feral eagerness. "Where?"

"A trader passed through the village a ten-night gone, a dealer in spear heads and thin twine. He spoke that night beside the fire, and I told him a little of his road and the dangers thereon, and in return he spoke of a great treasure far to the north." The Pupil frowned. "He called it by a strange name, 'Library,' I think, but he was certain of the treasure."

"How so?"

"The clans use Books for fuel."

The old man blanched at the heresy, and his thin hands whitened beneath their dirt as he clutched at the edge of the table.

"For fuel!" He groaned and stared at the few volumes on the shelves. "Why? Have they no Reader?"

"The Trader did not say."

"The fools!" He glared at the young man. "Kalin must hear of this. An expedition must set out to the north and save this great treasure. You should have spoken of this before."

"You were busy, Reader," stammered the young man. "Deep in your studies of the ancient lore." His eyes flickered towards the book. "Have you . . .?"

"No."

"But——" The Pupil swallowed at his own temerity. "How long will it be?"

"I know not." The old man sighed and, rising from his chair, began to pace the tiny room. "For as long as the village can remember, there has always been a Reader at Kalin. The old tales tell us that when our fathers first came here they had no treasure; it was not until long after that Books were found. The King at that time was wise, and he remembered what his fathers had told him. He knew of the secrets to be found in the Books, wonderful secrets and knowledge of tremendous power—if only they could be read, for in that time there was none who

could tell what the words meant or even how to speak them. He did a wise thing. He pointed to a man and made him the first Reader. He gave him a place to live and food to eat, fire to warm himself and clothes to wear. He gave him all a man would need, and he gave him a single command. 'Learn to Read,' the King said, and so it was."

"And did he? Learn to read, I mean?"

"I know not. All that I know is what my master told me when he lay dying, and I became the Reader, for that was a long, long time ago, and men's memories are not what they should be. But one thing is certain. Since that time there has always been a Reader here, and that Reader has had a Pupil to pass on his knowledge when he dies. Slowly, and it took many Readers, we learned how to make sounds which were the words, and one Reader, so I believe, even tried to copy the words. He used a charred stick and wrote strange signs on the table. He was betrayed by his Pupil and died by burning."

"Why, Reader?"

"He was a fool. For who knows what terrors he may have set free by his bungling? Until we know the true meaning of the words how dare we copy them? For by copying them we may double powers of great evil and unleash forces only held in check by the skill of the ancients who locked them in the Books."

"They are but marks," said the Pupil slowly. "Strange to be sure, but similar marks are made by children at their play. What harm in that?"

"Could you copy them?" Abruptly the old man thrust the open book towards his pupil. "See? How small they are, and how neat? How many to a page, and all one like the other? Could you copy them so? Could any man?" He stared avidly at the fretted page. "Such words

of power! In these Books lie great secrets. The forgotten knowledge of how to build houses which will know no dampness. Of how to move swiftly through the air and over the face of the land. Knowledge of how to defeat the Great Enemy, and of how to slay our foes at a distance. If we could but understand . . . " His voice trailed into silence, and shadows moved like living things over the walls of the room. The pupil sighed.

"But it has been so long," he murmured. "How many Readers have tried to unravel the secrets, and how many have failed?" He stared sombrely at the guttering flame. "Could it be that Kalin the Warrior is right? Are the Books a snare for the m i n d s of men, offering promise where there is no promise to offer? Indeed, sometimes I . . ." He cried out as the old man stepped towards him, and the sound of the Reader's thin hand against his cheek echoed through the tiny room with a meaty, soggy sound.

"Do you blaspheme?" The Reader trembled in his wrath. "Have a care, Pupil. You are young, but even youth must obey the sacred tenets of our village. Who are you to sneer? These Books are sacred; all the Kings have agreed on that, and our ancestors knew that the road back to the Golden Age was to be found in these pages. It is not for you to question such authority."

"Your pardon, Reader," stammered the young man. "It is just that it has been so long—and still the crops fail and men die, and still we wait for the Books to show us the way."

"And they will, my son." The old man seemed to have recovered h i s composure. "Listen." Painfully, squinting in the weak light of the crude lamp, he began to read from the tattered volume, his thin, dirt-stained finger moving slowly across the page.

*"In the triode valve, there-*

*fore, the weak oscillations set up by the incoming wave are caused by the action of the grid, to control the much greater power which is applied between anode and filament.*" He glared triumphantly at the young man. "You see?"

"I hear your words, Reader," said the Pupil slowly. "But their understanding I have not. To me they are as the sounds the Hairies make, noises without meaning, sounds made by a mouth as the river makes sounds when it passes across stones." He looked at the old man. "What do they mean?"

"That is why there is a Reader and a Pupil in Kalin," said the old man grimly. "These words must hold great power and we are to find how to use that power." He sighed as he slumped in one of the crude chairs and pulled the lamp a little nearer. "We shall read the Book together. It is important that you should know these words before I die, for then there will be none to teach you how they should sound when coming from the mouth. It may be that if we really knew how they should sound their power would be ours, but we must do what we can. Now. Say after me. Anode."

The way he said it would have made the word unrecognisable even to the man who had first written the book, a slurring, distorted jumble of vowels and consonants, but the young man listened and forced his tongue to repeat the word.

"Aynnowdee."

The old man nodded and his thin, claw-like finger passed on to the next word as he struggled with the once-a-generation task of forcing his pupil to commit the books to memory.

KALIN the Warrior sat on his mount and let his sunken black eyes drift watchfully over the ridge of the hill. A small, dark, thick-set young

man, he had a shock of long black hair and a jagged scar ran over his plucked cheeks. Rough woollens covered his body and a corselet of leather studded with strips of rusting iron protected his chest. A sword hung at his side and a short bow was slung on one shoulder. His mount had no saddle, no shoes, and tossed its head impatiently at the twist of hide which served as a bridle.

"Have you sighted them?" He kept his eyes on the ridge as he spoke, not looking at the swarthy man standing by the horse.

"The beaters are out, Kalin," said the man with the easy familiarity of a comrade. "Once they flush the game the twangers will stick them."

"Good." The warrior nodded then stiffened as a stooped black figure scuttled over the sky-line and began to run down the hill. Others followed it, all moving with a peculiar bounding hop, and the man beside the horse sucked in his breath with anticipation.

"Now, Kalin?"

"Wait. The Hairies are cunning and will scatter if we close in too soon. Let them get well within range."

Tensely he watched as the little group of dark figures ran down the hill, then, as shapes of men appeared on the sky-line, unslung his bow and fitted an arrow to the thong. At his side the man raised a horn to his lips, inflated his chest, and waited, watching his leader.

"Now!"

The horn made a low droning note and as the sound echoed from the ridge the valley sprang into sudden life. Men appeared armed with bows, and the air shrilled to the sound of plucked strings. A small figure jerked, an arrow sticking from its chest, then fell in dying convulsions. Others tumbled as they ran, then the group had scattered and men yelled hoarsely as they gave chase.

Kalin grinned, a snarling

twist of his lips, and his heels thudded against the ribs of his mount.

A dark figure rose before him, fell as the warrior released his arrow and the loping stride of the horse cut down the distance to the next running figure. The Hairy was cunning. He heard the sound of the unshod hooves on the thick grass and turned, falling to his face as an arrow whined through the air where he had been a moment before, then, as horse and rider thundered past, he clawed at Kalin's leg and pulled him to the ground.

Before he hit the ground the warrior had twisted away from the talons clutching at his ankle. He rolled, sprang to his feet, and ducked as the Hairy rushed at him, fanged mouth agape and talons outstretched towards his eyes. The stench coming from the shaggy pelt almost made Kalin vomit and he dived to windward as he tugged at his sword.

The weapon was a strip of heavy iron, hammered to a rough edge and with a crude point. Leather thongs made a hilt and the guard was a piece of wood. Kalin swung as the Hairy rushed at him, slamming the dull edge deep into the sloping skull of the distorted man-shape, and jumped aside as the creature died with kicking reflex action.

Sombrely he tugged out the sword, wiped it on the pelt, and searched for his bow. It had broken in the fall and he swore as he held the pieces, trying to see whether or not it could be repaired with a simple lashing. He was still studying it when a man came running towards him.

"Kalin."

"Yes?"

"A runner from the village with news for you alone."

"So?" The warrior kicked the dead thing lying at his feet and whistled to his horse. "How many?"

"Fifteen. Ten are dead, stuck by the twangers; the

others are wounded, none seriously. They will serve to haul the ploughs."

"Our own men?"

"One wounded, a clawed face. It is thought that he is blinded."

Kalin nodded and swung a leg over his mount. Slowly he rode back to the waiting group, the man loping easily at his side.

"This should warn the Hairies away from our village," said the man with deep satisfaction. "Most dead are young bucks and those we saved will serve us well." He looked at the broken bow. "Your twanger is broken."

"Yes. Now I shall have to buy a new one and pay for it with food for a year." The warrior scowled. "Always there is something. Our weapons break and cannot be mended. Stickers are lost and not true to aim. Food is scarce and the crops fail. It is a bad time for Kalin."

"Yet we have the treasure." The man stared cunningly up at his leader. "With such a treasure as we own it seems strange that the village should go hungry."

"Treasure!" Kalin didn't try to hide his contempt. "Food for two men, and they eat more than even the workers in the fields. Food for the Guards, and they do nothing but lean on their spears. Fat for lamps, fire for warmth, clothing for which there is no return." He looked at the man at his side. "How long has the village kept these men in idleness?"

"For as long as men remember. Ever since the days of the great burning, or anyway, a little after that. Five generations? Six?" The man shrugged. "I know not."

"It has been for eight generations," said Kalin sombrely. "The marks made when the Kings die show the age of the village, and there has always been a Reader." He thinned his lips. "And for why? What game have they killed? What good have they done? What enemies have they slain? Secrets!" He

spat. "The tales mumbled by old women."

"Perhaps you could sell the treasure?" suggested the man. "It should buy much food."

"Sell it where?" The warrior shook his head. "Swords we can sell to the clans of the east, twangers too and stickers to go with them. A few spears and stone hammers to those of the south in return for the fish they catch. But where to sell Books? To the Hairies? To those unknown tribes of the north? No, and even if we could we would not. The King is firm in the old beliefs. He will hear nothing against the treasure, and he is the King."

"Kings do not live forever," said the man slyly, "and you are the son of the King."

Kalin grunted and nudged his horse to greater speed.

The runner was a long-legged, stick-thin man, without weapons and wearing a simple tunic. He stood a little away from the main group, sniffing disdainfully at the stench from the captured Hairies and eyeing the shambling, man-ape creatures with disgust. A few paces from him a few men had gathered around a moaning soldier, holding his hands from his ravaged face and giving rough but kindly advice.

"Your face will heal, lad, and what's a scar or two to a young warrior?"

"My eyes! My eyes!"

"Think not of it. The Reader may be able to mend them. If half the things they say are true the Books must hold that knowledge."

"My eyes!"

Kalin rode up to them, ignoring the runner, and stared at the wounded man with quick appraisal. Slipping from his mount he knelt at the side of the stricken man.

"Your eyes are ruined," he said with cold abruptness. "You know that?"

"I feared it."

"It is true." The warior's voice became gentle, the coldness giving place to a friendly

warmth. "You have the choice, friend. To return to the village and live in darkness until you die, or . . ."

"No!" The wounded man struggled upright. "My eyes are gone and I would not live without my eyes. I have brothers who will take care of my mother; to them I would be an added burden."

"It is well." Kalin rose and nodded to a man at his side. Neither spoke but the man stepped forward, rusty iron in his hand, and the moaning of the blinded soldier died as blood gushed from his severed jugular. Kalin stared down at the dead man, sighed, and turned to the runner. "You have a message for me?"

The man nodded, sinking on one knee as he repeated the old ritual.

"Hail to Kalin. Kalin is dead."

It was all, but it was enough. For a moment the young man bowed his head in sorrow at the death of his father, then straightened and mounted his waiting horse.

"To the village," said the new king, and his heels thudded against the ribs of his mount.

AS WAS CUSTOM when the old king died and a new king took his place the village was assembled to hear his words and to learn his wishes. They assembled in the square before the House of the King, workers, warriors, those who made things with their hands and those who sang of departed glories. The Reader was there, blinking like an owl in the strong light, the filth of his body accentuated by the rain-washed skins of the others.

Kalin sat on the great chair, his warriors around him, and stared at the gathering with sombre eyes.

To be king was more than to be just a figurehead. He was now responsible for the entire welfare of the village, the arbitrator of arguments and the dispenser of justice. He was the leader, and these were his people.

"A warrior died today," he said evenly. "He died as a man should die. To his mother and family is given the use of a Hairy, to work, to sell, to hire as is the custom."

"It is well," droned the villagers, and envied the woman her luck even while sympathising with her at the loss of a son.

"Are there any among you with words you wish to speak?" Kalin droned the ritual as he gave leave to all men to speak their minds without fear of punishment or reprisal.

"I do."

"Smuth?" Kalin nodded. "Speak."

"My son is dying," said the man, a broad-shouldered farmer. "He is my only son and if he yields to the Great Enemy I shall be alone and without aid in my old age. I appeal to the King!"

"How so, Smuth?" said Kalin gently. "None can fight the Great Enemy."

"What of the treasure of Kalin? What of the Reader?"

"Yes," chorused the villagers. "What of the Reader?"

"My crops fail," babbled a man at the edge of the crowd. "They are poor and wilt as never before. I appeal to the King!"

Kalin smiled as he heard the shouts of those appealing for aid. From his high place his eyes sought out the thin figure of the Reader and he lifted his hand for silence.

"Hold! Let the Reader come close."

Slowly the old man edged through the crowd, his weak eyes running with water from the strong light and his darkness-bleached skin a ghastly pallor. He halted before the sombre figure of the king and stared defiantly at the scarred face above his own.

"Yes?"

"You have heard," said Kalin evenly. "Evil times have come to the village, and now is the time to use the secrets of the Books. You are the Reader. You have been

kept at the common charge to learn the ancient lore. What can you tell us of the old wisdom to aid us now?"

"What do you wish to know?"

"The son of Smuth is dying and the crops of Jon fail. How can we best these ills?"

"I have read the Books for many years," said the old man slowly. "And before me there was a Reader, and before him, and before him, back to the time when the earth still shone blue in the darkness and strange ruins littered the horizon. But in all those years nothing has been learned that gives us cause to believe that the Great Enemy can be defeated. Not even by those who dwelt in the Golden Age, for they died even as we die. I can do nothing for the son of Smuth."

A groan broke from the assembled villagers, a release of pent-up breath, and several men murmured as they stared at the gaunt face of the old man.

"Peace!" Kalin lifted his arm. "Death comes to all, and we know from our legends that men have always died." He stared at the Reader. "And about the crops?"

"There perhaps I can help," admitted the old man reluctantly. "There are words . . ."

"There are too many words," snapped Kalin. "Now we need deeds, not words. Talk!"

"Failure of crops may be due to a deficiency in the soil," said the old man mechanically, and sweat shone on his sallow features. "A cure may be affected by the use of humus and nitrogen compounds, chemical fertilizers and, in some cases, the importation of beneficial bacteria."

There was silence. A silence of straining eyes and watchful expectancy. It seemed to last for ever and, when it was obvious that the old man had no more to say, Kalin broke the silence.

"Do the Books says that?"

"Yes."

"And what does it mean?"

"It means what it says. They are the words and they will restore the soil so that Jon will fear no more for his crops."

"I have heard you speak," snapped Kalin angrily. "I have listened to the words, but words will not do as you claim. What do they mean? What must we do?"

"Humus," said the Reader sickly. "Nitrogen compounds. Bacteria. With those things we can restore the soil."

"But what are they?" Kalin frowned. "Humus, what is humus?"

The old man shrugged. What are they?"

"Nitrogen? Bacteria?

"I know not. But they are the words in the Books and they are the things we need."

"So." Kalin rose from his chair and gestured for dismissal. "It seems that the promise of the Books is no more than the promise of the wind. I must see into this. Until I assemble you again continue on your ways." He jerked his head towards a couple of his warriors.

"Follow me."

Grimly he strode towards the room which held the treasure of Kalin.

The guards saluted as he passed, and inside the small, dim-lit room his nose wrinkled as he smelt the stale air. Harshly he ordered more torches and in their flaring light stared coldly at the precious books.

"You," he pointed towards the Pupil. "Read me this." He picked up a book and thrust it into the other's hands. "Quickly now."

The Pupil swallowed as he opened the volume, bringing it close to his eyes as he stared at the small, blurred print.

*"Electricity is a force which is generated by a conductive metal cutting through a magnetic field."* He read slowly and painfully, slurring the words and running them together into incomprehen-

sible jargon. Kalin frowned and snatched the book away.

"What is this?" he said sternly. "Have you been kept in food and fire, light and clothing for so long and yet still cannot read?"

"Wait!" The old man shuffled forward and taking the book rested it reverently on the shelf. Calmly he stared at the angry king. "The Pupil is yet young," he said gently, "and the Books are hard even for me."

"Why should they be?"

"Why?" The old man smiled. "I will show you." Reaching out he took a bow from one of the warriors. "I am no hunter and I have never used a twanger in my life," he said. "And yet . . ." Taking an arrow he fitted it to the cord, drew it back and sent it deep into the planks of the floor. "See? Even I can send a sticker into a target." He handed back the bow.

"So?"

"You have seen what I could do. Would you take me as a warrior in your band?"

"Of course not. You . . ."

"I lack the skill to send a sticker fast and far. I need the learning before I can stalk my game and hit my target. Even so. And yet could your warriors read? I can use a twanger. Could they read a Book?" The old man shook his head. "No. Each to his skill and no man should tell another how to do what he cannot. I have spent my life learning to read the Books. Do not expect the same skill from my Pupil, even as you do not expect skill with a twanger from me."

"They are fair words," admitted Kalin. He gestured towards the books. "What is contained here?"

"Words," said the old man. "Words telling of great things. They were wise those men who lived in the Golden Age, and they put their wisdom into words and put those words into Books. They could teach us so much, how to travel fast and far, to keep warm in winter, to harness spirits to

serve us, and even to master the Great Secret."

"The Atom?" Kalin shrugged. "Old tales to frighten children."

"No." The Reader stared at the King and something strange burned in his eyes. "We know that is not so. We know that our ancestors had power we can but dream of. But those ancestors left us the knowledge of how to harness that power. They left it to us in the Books." He touched the stained and cracked covers with reverent fingers. "Why else did the old King collect them? Why else should he have appointed a Reader? Would our forefathers have saved the Books had they not known them to be of great value?"

"We have had them for almost eight generations," reminded Kalin. "If they contained what you say why haven't we mastered their secrets by now?"

"It takes time to train a warrior, to teach a man how to break a horse, and it takes time to show a woman how to spin and weave. How much longer then must it take for us to solve the meanings of these words?"

"You speak in riddles," snapped Kalin. He held up his bow. "This is a twanger. We call it so because . . ." he plucked the cord and the thin sound echoed through the room. "That is reasonable. A sticker sticks in things. A sword . . ." He frowned. "I know not why it is so called; a cutter would be better, but we have always called it a sword." He shrugged. "All these names have a meaning. They belong to something we can feel and touch. They are real. Of what use then are the words in the Books?"

"A woman learns to weave by an older woman showing her how," said the old man. "A young warrior learns how to aim his twanger with an older man at his side. A farmer is told what and what not to do by his father. Who can teach us how to use the words in the Books?"

"Then you admit they are valueless?"

"No." The Reader swallowed. "Even as a young girl needs to be taught how to clean the wool, to spin it, then to weave it, all slowly and step by step, so it is possible that we need more Books. To show a girl a loom and ask her to use it is asking too much. To ask me to fix meanings to words which I do not understand is asking too much."

"Then?"

"We need more Books."

"Impossible!" Kalin shook his head. "There are no more Books, and even if there were, of what use would they be?"

"I do not know," said the old man. "But the ancients must have made them for a purpose and our ancestors knew that purpose and saved them for their knowledge. Listen." Hastily he snatched up a book and began to read, slowly, painfully, but with a confidence and assurance the Pupil had lacked.

*"The energy is sent in very short bursts called 'pulses' and the receiver output is connected to a cathode-ray tube upon whose screen the received pulses appear. It is so arranged that as a pulse is sent off the cathode ray . . ."*

"Enough," snapped Kalin. "Are all these Books the same?"

"No."

"Is there none you can understand?"

The old man shook his head.

"Read me another."

Silently the Reader put back the book he had been reading and selected another. Licking dry lips he squinted in the flaring light of the torches as he stammered over the words.

*"Suppose for a moment that, when a condensation is formed, the condensation separates completely from the surrounding matter and leaves an empty crack all round. We imagine that a sphere of gas . . ."*

"Enough."

"Shall I read another?"

"Yes."

*"Most wounds, unless contaminated with dirt, are relatively clean to begin with so all that is necessary is to wash the area with soap and water and apply a sterile dressing . . ."* The old man let his voice fade into silence as he stared at the King. "You wish another?"

"No." Kalin stared down at the gaping boards of the floor. "You spoke of wounds?"

"Yes."

"What is a . . ." he frowned, " sterile dressing?"

"It should be placed on wounds."

"But what is it?"

"A cover I think," said the old man slowly. "Women wear dresses, so a dressing could be part of what they wear. But 'sterile'." He shook his head.

"You do not know?"

"No, but if we had more Books . . ."

"Yes," said Kalin thoughtfully. "That is interesting about wounds. The warriors would find such knowledge of great use, and if we could restore their sight and stop the festering rot?" He nodded. "There are other Books you say?"

"To the north there lies a great treasure," said the old man eagerly. "A Trader brought the news, he said . . ."

"I remember the Trader," said Kalin curtly. He stared at the Reader. "Listen," he said, "and mark my words. For too long have you and yours taken without giving, and it is in my mind to have done with the Books and their useless words. But you spoke of wounds and of healing, and such things are good." He turned and spoke again from where he stood by the sagging door.

"The expedition will start at dawn. If we find more Books and you can solve their secrets I shall be patient. If not then the treasure will be locked away and you will work in the fields. Kalin can do without a Reader and a Pupil." He raised his arm as the old man started to protest.

"At dawn."

Then he was gone and the torches went with him. Dimness returned to the room of books.

TWENTY men made up the expedition. Twenty young warriors, all armed with bows and swords, and skilled in the chase. With them went ten of the valuable horses and a store of food and water. Kalin led the column, grinning as the old Reader bounced on the back of his mount, and from time to time snapped instructions to the men running beside them.

They crossed the low hills, ready for trouble but meeting none, for their force was too strong for the mutated, man-ape things to attack. They camped under strong guard and rode only at daylight, and they made good speed as they pressed ever northward.

As they rode Kalin surveyed the country with shrewd eyes, watchful for attack and at the same time weighing the advantages of the terrain. They passed a few ruins, overgrown and crumbling beneath the twin onslaughts of vegetation and weather. Once they skirted a wide expanse of seared earth, hard and lava-like, glistening with an evil blackness and ringed with stunted trees, and once they saw a herd of wild cattle running from their approach.

At the end of the tenth day they came to a range of low hills, crossed them, and stared down at a scene of utter desolation.

Once it had been a city, but the bombs had torn the life from the metropolis, filled the streets with dead, and sprayed the buildings with heat and radiation. Now the vegetation had returned, great twisting vines and bloated leaves, creeping in from the fringe and thrusting at the tottering walls.

Further in was only an expanse of jumbled ruin, with here and there a similar area to the one they had passed.

Kalin halted and stared down at it with sombre eyes.

"This treasure," he said to the Reader. "Where is it?"

"I don't know, but the Trader said that the clans were using the Books for fuel."

"They found a better use for them than we did, then," said the king dryly. He stiffened as a thin thread of smoke rose from among the shattered buildings. "Morry, Sen, Willie." He made a sweeping gesture with his arm. "Take men and enter, sweep and cut. Twangers ready but hold. Whistle when ready."

The three he had named grunted, and each touched a couple of men on the shoulder. Silently they slipped into the ruins, bows ready, and vanished from sight. Kalin gestured again.

"Drop. Watch and wait."

Together the horses moved slowly towards the edge of the city, the warriors fanning out and circling the mounts. Even though he didn't understand what they were doing, the old Reader could admire their efficiency. Tensely they waited while the sun crawled towards the horizon and shadows began to thicken between the buildings.

From somewhere came a thin whistle, and Kalin exploded into action.

"On," he snapped. "Open and take. Hold until told."

Swiftly they advanced, bows ready and arrows tight against strings. The old man groaned as his mount jarred his sore bones, then forgot his discomfort as they broke out into a small clearing between the ruined buildings.

A fire burned steadily on a slab of uneven concrete, and around it two score men and women sat, tense with fear, as they stared at the circling warriors. They were wild, shaggy, dressed in garments of a short brown fur. The men had beards and wore knives at their belts. Kalin wasted no time.

"You." He pointed at a

big, swarthy man. "What tribe is this?"

"Tribe?" The man looked furtively at the young king. "We live here," he muttered. "We have always lived here." He licked his lips as he stared at the armed men. "What do you want with us?"

"There is a great treasure here," said the old man excitedly. "Where . . ."

"We need food," snapped Kalin, and glared at the Reader. "You have food?"

"Yes," said the man eagerly. "There is much meat here."

"We will eat," said Kalin, and turned to whisper orders to his men.

Curiously the old Reader watched while the strangers prepared the food. The animals they rapidly cleaned were small, with long thin tails and sharp snouts. He swallowed as he recognised them as rats, then sniffed hungrily at the odour of roasting meat. Rats were not a normal part of the village diet, but sensible men eat anything, and the Reader was hungry. Slowly he moved towards the fire, sniffing at the delicious odour, then cried out in horror at what he saw.

A woman was throwing books on the fire.

He snatched at them, singeing his fingers and burning his hands as he beat out the flames. The woman snarled at him, trying to take them back, and he thrust at her, calling to Kalin as she grabbed at the precious volumes.

"Look! The treasure! The Trader did not lie."

"Are they of use?" The young king stared at the half-ruined books. "Do they tell of wounds?"

"I don't know." The old man peered at them in the light of the dying sun, frowning at the unusual black lettering and tiny pictures. His lips moved as he tried to force his tongue to pronounce the unfamiliar words then, sadly, he admitted defeat. "I

cannot read them. The words are different."

"Then burn them." Kalin tossed them back on the fire. "First we will eat and after that we will find this treasure of yours." He stared at the strange tribe through hooded eyes. "Strong men," he muttered, more to himself than to the man at his side. "Strong women, also. We could use them in the village; there is much to do and labour is short."

He took a steaming mass of near-raw flesh from a spit and sank white teeth in the charred meat. The Reader followed his example and for a while the men gulped their food in silence.

"Shall we sleep here?" The old man wiped his stained beard. "These people seem friendly enough."

"They wait for a chance to kill us," said Kalin sombrely. "Watch their eyes, the way they glance at each other and then at us. They hate and fear us and wait to do us ill."

"Do your men know?" The old man half-rose to his feet, then gasped as the king gripped his thin arm.

"Sit down. My men have their orders." Kalin belched. "Do you see the knives they wear in their belts? Good weapons those, better than ours by far." He licked his lips. "There would be a treasure indeed if we could but find a store of such."

"We came for Books," said the Reader sternly. "With Books we can make knives and all manner of weapons, heal wounds without trace and speak across distances. What can you do with knives?"

"Kill," said Kalin, and laughed at the expression on the old man's face. "Come. Let us find this treasure."

The swarthy man he had spoken to before answered their questions. Yes, there was a great store of the things they used for fuel. It was a little way off, in a crumbling ruin. Yes, there were other things, but the place was large and full of ghosts and his

people had not searched. Yes, he would guide them to it now." He seemed pleased at their desire to move at once and watching him, the old Reader remembered the words of his king and shivered.

They lit torches they had brought with them, thick branches wrapped with fat-soaked wool, and in the smouldering light they followed their guide.

He led them through sagging buildings and over heaped rubble to where an opening gaped in a mound of brick. He led them through the opening, wriggling past balanced columns and into a great hall, still intact, protected by a freak of chance and interlocking beams which supported the weight above. Shelves lined the great room, and on these shelves . . .

The Reader whimpered as he saw them, a whimper of sheer disbelief, and his thin hands ran over the backs of countless books.

"Well?" Kalin stood in the light of a flaring torch and stared at the great library. "Is this what you sought?"

"Yes," whispered the old man. "All this treasure! These many, many Books." He almost drooled. "We must take them back to Kalin."

"Take what you need," snapped the king. "Those which deal with the treating of wounds and others you think are important. Hurry."

"But there are too many here for me to read in one lifetime," protested the old man. He took down a book and blew the dust from its mouldering pages. "Perhaps this one?" He flipped the pages and stared at the unfamiliar words.

"No?"

"No." The Reader dropped it and ran to another. "This, perhaps?" He swallowed as he squinted in the flaring light. *"Once upon a time there were three bears who lived in a forest . . ."*

"Yes?"

"I'm not sure," stammered the old man. "There are so

many." He tucked the book under one arm and ran to another row of shelves. Hastily he selected a volume and stared at rows of writhing symbols. Dropping it, he snatched another, glanced at it, and brought it over nearer to the light.

*"If the grandeur of a planetary world in which the earth, as a grain of sand, is scarcely perceived, fills the understanding with wonder . . ."* He flicked pages and read again. *"As with all forces between bodies, the gravitational pull of the first body on a second is exactly equal in amount to the gravitational pull of the second body on the . . ."*

"Enough," said Kalin wearily, and his face as he glanced at the array of books was bitter with scorn. "Words! M e a n i n g l e s s words! How can we ever learn from these d e a d things?"

"We need time," said the old man desperately. Time . . ."

"We have no time." Kalin turned as a warrior entered the great room. "Yes?"

"Look!" The man held out something which glittered in the guttering light of the flaring torches. "See?"

He held out a long knife, a thing as different from that which Kalin wore at his side as a man was to a Hairy. It was smooth and polished, with a thin edge and a sharp point. The hilt was of turned wood and the guard of metal. It had a sheath, a thing of some hard, dull green substance, and as Kalin took it something burned deep in his eyes.

"Are there more?"

"Many more. In a small room towards the end of the building. I searched as you ordered and we found many of these lying among the ruins of many boxes. There are other things, too; strange things, long and made of metal and wood. All are covered with grease, see?" He ran his finger down the side of the blade.

"These other things? What are they like?"

"Like a long, thin pipe, open at one end and closed the other." The man hesitated. "We could use them as clubs, perhaps, but they are not light."

"Leave them," snapped the king. "Collect all you can of these. Subdue the rat-eaters and weigh them with burdens. Hurry!" His teeth flashed as he smiled at the old man. "There is our treasure, Reader. Blades for the warriors and the workers, knives for the farmers and those who build our houses. Now we no longer need to hammer scraps of iron."

Outside, men shrieked as they died beneath the thrumming bows of the warriors, and, like the rats they ate, fought and ran with frenzied desperation. The women, cow-like in their docility, filed into the store and were loaded with the salvaged bayonets. Kalin stood and snapped terse orders in the language he and the warriors understood, loading both prisoners and horses with loot from the store. Finally he turned to the old man.

"We have finished here, Reader. We must go now before the rat-eaters gather and attack. Come now."

"But the Books?" The old man blinked in the light of the torch he had stuck between two shelves. "Look. Here is one with pictures and another with simple words. Here is one with strange marks of houses lying in ruin and another with things I can readily understand. Take the Books, Kalin. Take the Books!"

"We cannot. The horses are loaded and we have no room to spare." He tensed as a whistle sounded from above. "Come."

"The Books . . ." The old man tripped as he followed the young king. "Save the Books."

Night had fallen, and the file of men and horses, warriors and loaded prisoners, crept forward through the

ruins, feeling their way in the dim light of the stars. Shadows followed them, but the thumming bows of the warriors prevented an attack. The Reader grumbled as he walked, still not wholly aware of what he had found and left behind. He carried a single book beneath his arm, one he had snatched as he ran from the great room, and he cried out as he fell, the book falling into the darkness.

"The Book," he babbled. "Help me find the Book."

"No time," snapped Kalin. "Hurry."

"You must have time. You . . ." The old man gulped as flame rose behind them. "The torch," he whispered. "I forgot the torch!" Desperately he grabbed at the young king as he pointed towards the rising flames. "Save the Books!"

"No."

"But that great treasure, it's burning, it's being lost for ever." Tears ran down the old man's cheeks. "Save the treasure."

"T r e a s u r e ?" Kalin shrugged and lifted his right arm against the stars. "This is my treasure." He touched the sword at his side. "And this." He gestured to the groaning men and sweating horses. "And these. These things are real: I can touch them, understand them, know them for what they are. Of what use are words to me?"

"But the Books?" The Reader stared at the red-lit horizon. "What of the Books?"

"Let them burn," said Kalin, and rode on into the night.

Behind him the flames climbed higher.

**Latest ideas on the connection between—**

# BRAIN AND MIND

**by PETER SUMMERS**

Nobody who knows anything about it doubts that the brain has a strong connection with the mind. This is not merely to say that one cannot exist without the other, but that the *states* of one *affect* the states of the other. Some people — intelligent people, too—believe that the workings of the brain are mere material signs of the mind's fluctuations. Other people—also intelligent—claim that the mind is simply the name we give to certain nonsomatic aspects of brain function. We do not have to trouble ourselves at this point with such philosophical theories. We can limit ourselves to a consideration of the *facts* which have made it clear that either brain and mind are closely connected or that they are different interpretations of the same thing.

One need look no further than the nearest lunatic asylum to find concrete proof that afflictions of the brain cause afflictions of the mind—as exemplified by nonphysical behaviour. In some inmates of asylums nothing can be found wrong with their brains; with others there are quite easily demonstrable injuries to various parts of the brain. A man with a tumour pressing on his nervous pathways may have his mind so deranged that he is only incompletely a member of the world we luckier ones live in. Things that have no existence for us have a reality to him. Ideas and concepts that are beyond us are perfectly "natural" to him. Thus he has no difficulty at all in believing that because he has a bit of broken glass in his pocket, the whole world is trying to track him down and get it away from him. To him, the bit of glass is a valuable diamond, and no amount of testing and experimentation will convince him otherwise. Normal people will accept the evidence of tests and experiments; the person with the injured brain will not. His mind works differently.

But not all brain injuries result in insanity, though to be

sure, the person involved is far from normal. Nevertheless, there may be disturbance of one aspect of mentality while all the rest of the mind is unaffected. There is a case on record of an elderly lady who was mentally normal in every respect except that she claimed to be constantly seeing a column of people in highly coloured clothes marching across her field of vision. Examination disclosed a quite small, non-malignant growth in her brain.

In another case, a young soldier had a motor cycle accident in which the frontal part of his brain was injured. This had no effect on his body, but his personality underwent a dramatic change; he became highly aggressive and overfamiliar with strangers. And the records of sleeping-sickness (which attacks the brain) patients are full of instances in which the patients became antisocial, secretive and miserable, even after they had been cured; the brain tissue was permanently damaged, and was keeping these people in this unhappy state.

There is also on record the case of a healthy, decent young labourer who had the greater part of his forebrain destroyed—and turned into a liar, cheat and complete wastrel. How many other people of this type, we must ask ourselves, are not, in effect, to blame for their behaviour? A classical example is the woman who was diagnosed as a nymphomaniac and treated by psychiatrists for several years before an observant doctor discovered that her abnormal behaviour was due entirely to a small tumour in her brain. The tumour was removed and she became a perfectly normal woman.

If such a serious thing as a tumour can produce such a profound distortion of mind, is it not likely that considerably less serious injuries will also result in an impairment of mental function, but on a lesser scale? One would expect that the smaller or less extensive the injury, the less would be the deviation from the mental norm. And this is what is actually observed to be the case.

On the very mild level, we find that the condition of the brain synapses (junctions between nerve fibres) has its outward manifestation in mental life. The person whose synapses are fairly wide apart or whose transmission of impulse across the junction is slow, is found

to be a placid person, slow-thinking, steady in action and outlook, unlikely to make hasty decisions, and staying quite calm in moments of stress. On the other hand, the person with narrow synapses or fast transmission of impulse, is highly strung, a rapid thinker, jumpy in temperament and action, liable to go off half-cocked, so to speak, and terribly distressed when things go wrong. Naturally, there are all grades in between these two extremes, but we can be pretty sure that this aspect of our mentality depends to a very large extent on what kind of synapses are in our brains.

Also, the speed with which impulses pass across a synapse is temporarily influenced by the condition of the blood stream. Alcohol, opium and various other compounds, when circulating in the blood, tend to slow down impulse transmission and produce "placid" states. So does fatigue, due probably to the lactic acid that is poured into the blood stream by contracting muscle. Agents which speed up synapse transmission, with the production of a "highly strung" state, are caffeine, tetanin and strychnine. Thus, it is easy to see that variations in our mental lives, and their consequent manifestations as changed behaviour, may well be due to the effects of various compounds present in the blood. A particular kind of diet on one day may make us irritable or elated the next day.

This question of compounds circulating in the blood stream is the most important mechanism, other than physical injury, by which the brain affects the mind. Most people are aware of the existence of hormones —those compounds which, created in the body by the ductless glands, circulate in the blood and produce effects in parts distant from the site of their production. Not so many people are aware of the important role played by hormones in our mental lives.

A hormone released by the thyroid gland has profound effects upon the body generally, but it also affects the mind. Too much of it causes a person to behave rather as though his synaptic transmission had been speeded up. He is mentally over-alert, always looking for something to do, always *finding* something to do, even when it is not worth doing. Too little thyroid hormone makes a person mentally sluggish, leth-

argic, uncaring. Such people do not want to do anything, even if it should be done.

And so it is with most of the other hormones; all have their effects on mentality. A short supply of hormones from the sex glands makes a person disinterested in the opposite sex to the point of antisociality; too much sex hormone may turn the person into something resembling a sex maniac. Hormones from the *adrenal* gland are connected with stress; they are released in large quantities whenever something goes wrong with our lives, physical or psychical. It is also possible that the release of these hormones into the blood stream *maintains* a feeling of stress—keeping us aware that something is wrong and telling us, in effect, to do something about it.

The point of all this hormone business is that nearly all the ductless glands—and certainly all those we have mentioned—are controlled by the pituitary body. This is another endocrine gland that sits in very close anatomical relation to the brain. Recent research indicates that it also has a close *physiological* relation with the brain. It appears that the pituitary, which controls so much of us, is itself controlled—by the brain.

Evidence is not yet sufficiently established to make this a certainty, but there is very little doubt that eventually the idea will be proved to be correct. Basically, the theory is that a substance (another hormone, really) is formed in a part of the brain near the pituitary, passes along small blood vessels to the pituitary and causes it to release *its* hormones, which then go and influence most of the other endocrine glands. Some of the experimental evidence may be found interesting—and here I am indebted to the Editor for information about these experiments, some of which have not been described before outside the medical Press.

If an intact (*i.e.*, completely normal) animal is submitted to a stressing stimulus, adrenal hormones are released into the blood stream in large amounts, where they can be fairly easily detected and measured. (They are usually measured indirectly, by counting the number of a certain type of white blood cell in the stressed animal's blood. This number decreases in proportion to the amount of adrenal hormones liberated.) But if a stressing stimulus is applied to

an animal from which the pituitary has been removed, no such liberation of adrenal hormones occurs. Further, if the pituitary is left in the animal, but its connections with the brain severed, a stressing stimulus does *not* produce great release of adrenal hormones.

These experiments show several things. They show what has been known for many years—that the release of adrenal hormones does not occur in animals lacking a pituitary. And they show what has only recently come to be discovered—that the pituitary body *alone* is not enough to allow the release of adrenal hormones to occur in large quantity. For this, the pituitary *must* have its brain connections intact.

Thus it is that researchers believe the brain plays a dominant role in the functioning of the pituitary, and thence in the functioning of other ductless glands. But the point of importance for us is that these experiments tend to show how the brain may affect the mind, even when it is not in the least bit injured. They show, in fact, how the brain may affect the mind under perfectly *normal* conditions.

For stressing stimuli that do not in any way "touch" the body can give rise to the heightened release of adrenal hormones. That is, something happening in the external world, reaching the *mind* rather than the body, triggers off the train of events through brain to pituitary to adrenal, which results in the typical hormonal reaction to stress—and which in turn is accompanied by the typical behavioural (*i.e.*, mental) response to stress.

In humans it has been found that this high level of adrenal hormones circulating in the blood stream *does* in fact accompany various depressive states, acute and chronic. And at the forefront of neurosurgery, operations for the removal of the pituitary are being carried out on human patients. The results of these operations are too vague and ill-defined at present to allow of satisfactory "popular" description. Even so, it can be said that the operation often produces at least a temporary release from the depressive state—indicating once again that the brain has a direct effect on the mind in the physiologically normal patient.

# ONE HOUR

BY

GEORGE C. DUNCAN

THE SUN picked the busy flight of a fly from the dusky shadows of the classroom. The chestnut tree outside the open window waved sleepily to the fresh wind of spring. The cones of blossoms dancing gracefully so that they peeped into the lives of the children and the teacher inside. The tree stretched high beside the school, almost to the clock tower, which showed three o'clock on a warm and sleepy afternoon.

The village which clustered round was quiet. It seemed as though the unusual warmth had made it closer in on itself than usual. It crouched low as though waiting for the time to pass. The red roofs were inclined in crazy jumbles of patterns known only to the pigeons which rested or crooned upon the slates.

Three tenuous voices rose in a song in the classroom and the old teacher who sat at the desk waved a ruler in time to the young voices. It was not a beautiful melody, but the earnest efforts of the two small girls and the freckle-faced boy gave it a sweetness which maybe the song had never possessed before. The singers sat down with solemn dignity, and maybe because it was a special occasion they did not look out to the freedom of the outside or even to the horse chestnut flower cones.

Papa Jones, their teacher, was not the type of man one would expect children to love. People said he was doddery. He knew they said that about him and inside himself he was hurt, but did not show it. He had been in the world war which had something to do with his grey hair, and the grey moustache which helped to cover the prematurely aged

face. He had been blown up and then buried. The enemy had dug him out when they had been burying their own dead.

"This one's alive," the younger man had said when he came upon the crushed body.

"One of *them*." The sergeant had spat onto the head of the living dead. "Cover him up."

"Maybe if we take him out it will save us digging deeper," the young man had replied. It was true; take the living enemy out and there would be room for the dead friend. The sergeant debated the point in his head. He was a heavy and slow man, beaten to stupidity by cruelty.

They had dragged the Papa Jones from his grave and thrown him roughly to the side. Later, when they were finished with their task, they were tired and walked past him. The next day the young soldier had passed by and saw that Papa Jones had refused death. He lay on his side, unable to move, and only his eyes showed he still had feeling and breath. The soldier walked a little past and then came back. He looked down, wondering to himself that the body had not died. He stooped and picked him up, and that was how Papa Jones had been saved.

"TELL us a story," one of the little girls asked. He nodded, and lifting the lid of the desk he felt for the book. He took it out, fussed about polishing his glasses, opened the pages and adjusted them very carefully. He looked over his glasses at the attentive class of three.

He wondered why he had stayed behind with them when he would rather have gone home and sat in his chair on the verandah. There was a bamboo table with worn edges upon which he stood his glass of lemon juice. When it was hot he liked to sit there on Sunday afternoons and sip his drink and not look at the book which lay on his knees.

Sometimes one of the children came round to see him.

"Tell me about the flowers, Papa Jones."

"What do you want to know? They come in the summer and nod their heads to the bees, so that they will know the honey is ready to be collected."

"How do the flowers know the honey is ready? It's away deep in their petals and they can't see it."

"They make the honey so that the bees can come for it. They know."

It was the way that he said his last two words which had caused the children to treat him differently. When Papa Jones said "They know," just like that, it explained everything.

He dragged the large silver watch from his waistcoat pocket and looked at it. The face seemed to go far away, as though it had fallen into a stream and blurred the outline. A mist of perspiration clouded the skin on his brow like the kettle steam on a cold glass. The watch came to the surface of the stream just long enough for him to see the time. He put it away and turned to the book.

"Once upon a time——" he started. His voice found power as the story unfolded, and as he spoke his mind wandered to other things. The director had told him in that hurried and snatched conversation:

"Your last chance, Papa Jones. If you don't take it you know no one can do anything for you."

He wondered if he had done the right thing. And yet there was really no other course. There had been the warning, which had been the shock: barely gave you time to think even though you knew that it was inevitable. He had expected it would be something like this but not quite.

The story found its way through the magic castle; the prince came and rescued the princess. It was a pity that Maria had thought he was dead and not waited for him

to return. That was her daughter sitting in front of him now. She looked like her mother. Even at this age she reminded him of Maria when he had first known her. She was eighteen then, young, willowy and full of love for him. He had been twenty and as ardent as only twenty years can make a man.

They used to sit beside the stream over in the field behind the school and just think of one another and how good it was to live. It was that joy of feeling the life in your veins, to know the thoughts which streamed through your head. Muddled emotional thoughts maybe, but every one of them more alive than the last. Maria had such lovely eyes. He remembered how her eyelashes had stroked her cheek when she smiled at him.

It would be nice to go over to the stream now. It had been so long since he had seen it. Maybe the frogs still sat on the leaves or hid beside the stones in the running water. He looked at his watch when the story ended. The prince and princess were going to live happily ever after in the book. He put it quietly and almost with reverence in the desk and closed it for the last time.

The quietness in the village penetrated even into the classroom. There was only the sound of the insects and the fly buzzing at the window. The tree making a swishing with its leaves and branches in the wind almost covering the sound of the crooning pigeons on the red roofs.

"Shall we go for a little walk over to the stream?" he asked the children. The last little walk—and the thought almost choked him. He nearly lost control then, and the feeling brought the perspiration back in beads to his brow. The children arranged themselves around him. He held the little girls' hands and the freckle-faced boy looked up at him with confidence. Almost as much as to say: "That's all right, Papa Jones,

I'm a big boy, really. I can look after myself."

He closed the classroom door.

"Why did everybody run away, Papa Jones?" Maria's daughter asked.

He thought about his answer. They wouldn't understand he decided. "Because the wireless issued a warning. They thought everybody round here could try to get away."

He measured his steps down the worn stairs into the playground.

"But why has everybody gone home except us?" she pressed him. "Will they get away?" she mimicked his words.

"I don't think that any of them will get away," he explained. "And you," he waved his hand to include all three children, "couldn't get home nor go in the cars with the others. There wasn't room for everybody." He didn't say that the burst of machine gun fire had told him the story that they were all already dead. The 'bus load of children and mothers hadn't gone far when the 'plane had blocked the road and escape for others with the gun. At this side of the school you couldn't see the pall of smoke which drifted up from the burning bodies in the overturned 'bus.

You needn't see the cars with their dead passengers. The driver without a face, still clutching the wheel of the car. He mustn't think of these things he told himself. It was only five minutes to four o'clock. Not long to go now, and he must make them happy in those five minutes.

His hand was being shaken to attract his attention. "Why can't we go home?" Three eager little faces looked up at him. He smiled and from somewhere he found a new strength. He was strangely happy. He was glad they had been able to have this hour together, doing the things they had always done.

Their bodies would have been mangled up on the road there if he had done what seemed to be the sensible

thing. Maybe this was happening elsewhere. The warning given in good faith and then the 'planes diving down to block the roads so that there was no escape. No, not even for the little children.

He looked at his watch. "We'll all go home at four o'clock," he said, and with his new strength he chased after the children to the stream. The girls picked some buttercups and the little boy peeled off his stockings and shoes to wade in the stream.

How long can two minutes last? Papa Jones stood on a stone with the habit of a lifetime to avoid getting his shoes wet. The little frog was still sitting beside the stone just as he was when Papa Jones had been a little boy. Just as he was when he had come here with Maria.

The old clock in the tower struck the first stroke of four and he straightened his back. The children didn't notice, but he looked up at the white clouds and prayed silently.

The sun disappeared behind a dark cloud at the last stroke. It was a mushroom shaped cloud.

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**THE ENVIED**

is the title that Jonathan Burke gives to his long novel which will appear in next month's **Authentic** —a tale in the usual elegant Burke style. Supporting it will be several short stories from old and new authors, together with a good helping of the kind of stimulating non-fiction you have come to expect from this magazine.

**AUTHENTIC** ———— A MONTHLY MUST!

# BACK TO GO FORWARD

by W. W. BYFORD, B.Sc.

SWIMMING from France to England is one thing. Getting a spaceship from Earth to Venus will be another. Nevertheless, the first was achieved as the other will be—by proper application of Newton's third law of motion: "Action and reaction are always equal and opposite." A swimmer crosses the Channel in one direction by pushing enough water in the opposite direction. The first spaceship will probably cross interplanetary space by pushing enough of something in the opposite direction to that in which it travels.

Captain Webb, in 1875, took twenty-one hours and forty-five minutes to cross from Dover to Calais. Burgess, in 1911, did the same journey in twenty-two hours thirty-five minutes. In September, 1953, a woman, Florence Chadwick, swam from England to France in fourteen hours forty-two minutes. That does not imply that Florence was stronger than the Captain. Modern tricks such as greasing the body do not account for so big a difference in the timing. The important factor is that new swimming strokes more effectively push water away from the swimmer in the opposite direction to that in which progress is required.

Try this simple experiment: Cut three pieces of very thin wood 1½ x ¼ in. with a point at one end and a cleft at the other. Into the cleft in one insert a small chip of broken glass; into the second insert a crystal of sugar; and into the third a bit of camphor. Gently launch each in turn into a sink-bowl or bath tub of water. It will be seen that, glass being insoluble in water, craft No. 1 remains virtually stationary; in the second the sugar streams into solution behind the craft and for a little while it moves forward; camphor is only very slightly

soluble, but the little that goes into solution so affects the surface tension that movement of water molecules takes place rapidly and the craft is seen to move steadily for a long period of time.

Now, when we come to consider the movement of almost all objects on Earth, in order that one thing shall be moved in a given direction something else is moved in the opposite direction. When a shell is fired from a gun, as the shell moves forward the gun moves backward. The shell, of course, is much lighter than the gun and so the shell moves forward much more quickly, and farther, than the gun moves backward. Newton's statement that the reaction, besides being opposite to the action, is equal to it, enables us to calculate the speed of recoil of a gun, the weight of the shell and the muzzle velocity of the shell. When Newton said that the reaction is *equal* to the action he meant that the force which pushes the gun backward is equal to that which pushes the shell forward. The shell is lighter than the gun and, therefore, the forces due to firing of the propellant powders in the cartridges cause the shell to move rapidly and the gun to move less rapidly.

On Earth we can walk or run and jump by pushing the Earth away from us. We do actually move the Earth when we jump into the air, but consider the number of times the Earth is heavier than a man and divide the height he jumps by this number to see how small a fraction of an inch the Earth moves. And, of course, when the man falls back to Earth, the Earth also falls towards the man through the same small distance and all is as it was.

On water we can move a boat with oars or paddles which push water backwards away from the boat so that the boat moves in a forward direction.

When the internal combustion engine gave us sufficient power to turn a propeller

fast enough to push a big enough weight of air backwards quickly enough—why then we were able to fly through the air.

In space, however, we shall have no earth or water to push away benind us in order to advance. In order that we may move forward we may have to have something to push backwards. We shall have to take it with us. That is what we mean by fuel load.

Fuel implies burning. We have the habit of getting our power on Earth by using the available oxygen all around us to burn things, but in space there'll be no burning as we understand it on Earth. The chemistry of rocket fuels is a story that is just beginning, but in space why bother to burn anything? The spaceship could be made to move in any direction if anyone aboard threw a stone from it in the opposite direction. But remember the velocity factor. The stone is much lighter than the ship and so the heavy ship will move very slowly and the stone may even be unable to escape from the gravitational attraction of the ship, and, by returning to it, bring the vessel back to its original position. Take heavier stones so that when the stone is thrown the vessel moves more quickly? Not a very practical idea. Throw the stone more rapidly? Fire bullets from a gun? That is what a rocket does. The bullets are now very small indeed—molecules of gases—but they are discharged at high velocity. And from what kind of gun do you fire a molecule? You don't. You merely make it hot. A hot molecule is a molecule in rapid movement. That's what we mean by heat.

We are so used to burning things to make heat that we are ready to call any chemical reaction which produces heat a form of burning. Rocket propulsion then, depends upon heat-producing chemical reactions which send a stream of fast moving molecules backward to send the rocket

forward. The faster these molecules are discharged the more effectively they will send the heavy mass of the spaceship forward. The speed of the molecule's departure depends upon the temperature of the chemical reaction producing them. The best we can do by way of temperature of chemical reactions is below 3,000° C. This means that quite a lot of chemical fuel must be carried to give sufficient weight of molecules to be discharged effectively to move the weight of the ship.

Chemical reactions take place between atoms so that they arrange themselves in new ways. No atoms are destroyed or new atoms created. That is the reason why the temperature range from chemical reactions is limited.

But suppose atoms are destroyed or created. That, of course, gives the power to nuclear reactions and produces temperatures which are really high. The fast moving molecules at Hiroshima were an example of how a very small weight of substance can move enormous quantities of matter. In such reactions we have real possibilities if only we can control them sufficiently to produce a thin stream of molecules moving thousands of times faster than those issuing from the tail of a chemical rocket. An ounce of fuel might then suffice to propel a vessel of many tons weight at high velocity into and across interplanetary space.

There is an interesting variation on the *Back to go Forward* theme. One object can be set in motion by bringing another to rest, or by slowing it down. Thus water in motion can pass through turbines and be slowed down by setting electric generators in motion. Man's earliest conquest of the ocean used the same principle in slowing down the moving air of the wind against his sails so that his ships went forward. Is there anything in space like that wind? There is no air so there can be no wind. There is, however, move-

ment, not of molecules, but of all manner of odd particles smaller by far than atoms—at least in some regions beyond pure atmosphere. Light and all manner of radiations traverse space. Have you ever seen one of those little toys in an optician's shop window—a thing like a light bulb with a little paddle wheel inside continually rotating under the action of radiation? A stream of electrons flows from one of the electrode plates to the other. Only the upper half of the little mica paddle wheel is in this section, and so it rotates and rolls along the supporting rails. By reversing the direction of current applied to the ends of the tube, the stream is reversed and the wheel changes its direction.

Imagine a conventionally shaped rocket thrusting out into space under chemical or nuclear fuel, then, once clear of resistant air, shaking out enormous wings acres in area to catch an adequate quota of sub-atomic energy! This design is probably quite impracticable, but, theoretically, it might work. We should then have ships that really do *sail* through space.

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## Answers to DO YOU KNOW YOUR STARS?

(See issue No. 49)

(a) Wolf 359.
(b) Sirius.
(c) Alpha Centauri
(d) Betelgeuse.
(e) Meteor.

**Who would YOU pick to save the world if it were a matter of——**

# Won't Power

*by S. M. LANE*

BRIGHT sunlight strained through the thick roof of leaves and made a dappled carpet of the forest floor. Birds threatened to burst their lungs as they sang in praise of life. Insects hummed in the warm air and the scene was peaceful and beautiful.

It was all wasted on Gwun.

Exaltation surged through him and his football-shaped body cordled with bloon. The crimson streaks, of which he was so proud, stood out in sharp contrast to the dark blue of his outer shell and his six eyes glowed with triumph.

Another mission was about to be successfully accomplished. One more planet would join those already basking in the munificence of the Multiplicity of Wills.

He carefully extended another thought tendril and confirmed his first judgment. There was a total lack of awareness.

The simplicity of the thought stream he had entered amazed Gwun, although it was so garbled and lacking in coherent form that he could not begin to understand it. But he did not need to understand it. The salient fact was triumphantly clear. No awareness.

The idea of a race that could rise to control a planet and yet remain in ignorance of the power of the Will was a strange one to Gwun. Never before, in all his travels, had he encountered such a thing.

He had no doubt that the specimen he faced *was* a member of the ruling race. Long before attempting transition, Gwun had conducted

his usual preliminary mental survey of the planet so that he might immediately recognise the rulers when he began his field operations.

He inspected the other again and was gratified to see that his mental impression had been so accurate. He was also amused at the hopelessly inefficient construction of the strange life form.

Two appendages supported an elongated main mass, on either side of which hung two manipulative tentacles. The Will-centre was contained in a smaller mass perched on top of the larger. An absurdly exposed position. And only two eyes! The loose, brightly coloured outer coverings were probably intended as protection against the climatic conditions of the planet.

Gwun heepled his churd at the easy conquest that lay ahead and, carefully re-establishing contact with the stranger, he proceeded to deliver his standard thought pattern for such occasions.

"I am Gwun. I appear before you as an official emissary of the Multiplicity of Wills. Your planet has been selected as the next to be absorbed within the framework of our glorious empire. Very shortly you and your people will be under the benevolent control of the Great Will."

He paused, expecting one of the standard reactions to his news: horror, anger, surprise, disbelief, even attempted physical violence, but there was nothing apart from mild interest. No emotional response was detectable.

Surprised but not dismayed, Gwun continued: "It is quite useless to try resistance. You have not the Will-power necessary to oppose us, and the sooner that fact is realised the better for everyone concerned.

"Bluff will not help you either. I have already probed you and ascertained that you are completely lacking in awareness. It is axiomatic of the Multiplicity that where there is no awareness there

can be no developed Will."

The other regarded him with wide blue eyes that gazed intently from under a fringe of tousled fair hair.

If Gwun had not known that he was facing a member of the most advanced race on the planet he would have thought that he had not been understood. Why even a Blyp chick fresh from its shell would have shown more interest.

"On my report as senior member of the Field Operating Section of the Supreme Council of the Multiplicity of Wills, the decision will be taken as to whether or not your planet should be taken over. My report will, of course, be favourable. I can't see your race ever creating a threat to the Great Will.

"My only worry is that the Council may doubt the accuracy of my report. Conditions here are too good to be true, and your astoundingly low level of awareness is such a unique quality that——"

He broke off and a slow prugle spread across his voosh. "But of course, the solution is simple. I shall take you back with me so that the Council may study you.

"Relax your mind and let my Will take complete charge. You will find it quite simple. Now, come along with me."

"Shan't," said the other, after a moment's pause. And Gwun felt his reason totter.

He had already begun to kadth and his body had grown quite tenuous when this unexpected defiance snapped him back to solidity in a most undignified manner.

It was not the act of defiance that had so shaken Gwun; many had defied him, briefly, before. It was the totally unexpected blaze of Will that had accompanied the word.

For a moment Gwun was at a loss. Had that amount of power come from this low form of life? Could such a powerful Will exist without awareness?

He took a firm grip on himself. If he began to doubt

the basic tenets of the Multiplicity it was as good as saying that his whole life had been based on falsities. He must have been mistaken.

That was it. Not expecting any resistance at all, he had been so surprised when the other opposed him, that he had magnified the incident out of all proportion.

Gwun tried again.

"I have told you that it is foolish to resist. You cannot possibly oppose my trained Will with any chance of success. You are only making things harder for yourself. I order you to come along with me."

His Will took a firm grip on the other as he prepared to kadth for the second time. Horror overwhelmed him. They did not budge.

Exerting all his trained abilities, Gwun strove to master the other, but he was up against a force that was unique in his experience. The Will of the creature not to go with him was unbelievably strong.

"I *won't* go with you," said his intended victim. "I don't like you. *You* go," and Gwun found himself helpless in the grip of the other. Before he realised what was happening, he was kadthed right off the planet and made an unceremonious appearance in the Council chamber.

His report created an uproar. It was garbled but emphatic. On no account should an attempt be made to incorporate that accursed planet within the Multiplicity. It would be suicide.

Gwun even went further. He recommended that they leave alone that whole section of the universe in order that the inhabitants of the planet could expand without contact.

"Their Wills," he babbled. "I've never seen anything like them. They are undeniable. Their Will-power is beyond imagination and the awful thing about it is that they have no awareness. It is so alien and irresistible that we could never face up to them. Leave

them alone. Be satisfied or we may lose all we have."

The Council took a hurried vote and Gwun's resolution was carried unanimously. He was given a long vacation so that he might once again build up confidence in his Will, although it was obvious that he would never again be the firm, assured agent of old.

Meanwhile, his recent opponent was trotting unconcernedly by the edge of the wood, all thoughts of his recent meeting gone completely from his head.

As he came in sight of a modern bungalow with a long garden that backed right onto the woods, a voice called out: "Robin, your lunch is ready."

He immediately veered off in the opposite direction and vanished into the shadow of the trees.

"Did you see that?" asked his mother, peering out of the kitchen window at his retreating form. "He heard me and deliberately went the other way."

Her husband joined her and put his arm about her shoulders.

"You should know from experience by now, my dear, that if Robin wants to do something he does it—come what may. It's about time we paddled some obedience into him. He's too self-willed. Sometimes I think that there's no one with as much willpower as a five year old boy'"

## DO YOU KNOW— YOUR PLANETS?

(1) Which is the largest planet?
(2) Which is the smallest planet?
(3) Which is the hottest planet?
(4) Which is the coldest planet?
(6) Which is the lightest planet, volume for volume?
(5) Which is the heaviest planet, volume for volume?

(Answers on page 116.)

# ALBERT EINSTEIN

by H.J.C.

Those of us who were duds at school can always point to Einstein with whom we have something in common—even if we do not share his genius. For young Albert was the very opposite of a promising student, mainly perhaps because he was rather contemptuous of the Teutonic atmosphere of his school and the rigidity of its curriculum. Having enough intelligence to know that open rebellion would have incurred a great waste of energy, he chose the attitude of simply ignoring authority and orthodoxy, and going his own sweet, enchanted way.

He has carried this attitude with him all his life. It has made him sceptical, a little introspective, liberal-minded and an acute observer of the frailty of human conduct codes. It has also made him the world's greatest theoretical physicist. So great is his independence of mind (and knowledge, too, of course) that he can categorically reject "modern physics" and take an almost lone position as disbeliever in the quantum theory.

Through all this deep concern with physical matters, Einstein has yet remained what is often called a religious man. When objectors to the idea of evolution said that God might have created the rock strata and strewn them with fossils, Einstein remarked that: "God is ingenious, but He is not malicious."

Perhaps the greatest single factor which distinguishes Einstein from his peers is that he is still a firm adherent to the theory of causation—while other eminent physicists are beginning to doubt that subatomic phenomena have a causal basis. Thus Einstein is, in a sense, being old-fashioned. He is clinging to an idea which, after all, lies at the very root of all science. To him, everything has a cause. He has built his whole life and philosophy on that idea.

And the event which really

made Einstein's reputation was when he found a flaw in Newton's theory of gravitation. Newton had a wonderful mind. It had to be an even more wonderful one to pick holes in its workings. Einstein realised that Newton had assumed that space and time were absolute and constant for all observers. A very *reasonable* assumption, but one which could be experimentally disproved. Thus was born the whole vast revolution in fundamental physics from which emerged the theory of relativity.

Many people, being told that science advances only by experiment, and that Einstein is a *theoretical* physicist, ask the question: How can this man, sitting in an armchair without any apparatus or gadgets, have done so much to advance physics? The answer, of course, lies in the fact that Einstein's ideas and calculations are based on the results of all the experiments that have ever been done in physics. And his conclusions are always framed in such a way that they can be tested experimentally, though in some cases we haven't yet the technique. Einstein doesn't mess about with apparatus; he leaves that to lesser minds. Nevertheless, he fully appreciates the necessity for experimental confirmation of theoretical ideas.

He is that very rare type of person who can profitably combine the freedoms of philosophy with the disciplines of science, manipulating each to the advantage of the other. Therein lies the essence of his greatness. But there is a further aspect to his intellectual stature. Unlike so many great names of the past, Einstein is not only a great scientist. He is a great man.

**When a pretty girl looks you in the eye, that's fine—unless you had anything to do with—**

# The Kid

by K. E. Smith

It all started when a guy dropped dead . . . And is ending the same way.

I'm in the bar now having a slow drink, and thinking of what happened today. It was the darndest, most unusual case I have ever encountered in ten years with the force.

The Kid was small, undersized, weighing about 100 or 110. The only part of him which seemed to have developed was his head. It was so large in proportion to his body that it appeared grotesque. His eyes were queer too. Very large and coloured a shade of green I had never seen before.

I'm attached to Homicide in L.A., and like I said, a guy dropped dead. There wasn't anything unusual about that fact itself. It happens all the time. I guess there are more deaths from heart failure nowadays than ever before.

Only this wasn't heart failure.

At first we thought it was. The Kid was employed by a character named Kruger as an office boy. From all accounts Kruger was a nasty piece of work, and the Kid, being rather slow and awkward in his first week of employment, had been having a hard time of it. Kruger gave him a dog's life and many times reduced the kid to tears. Others of the staff in the office later said that they all felt rather sorry for him.

The culmination came when Kruger called the Kid into his office, gave him a hell of a bawling out, and fired him. He created such an uproar that the rest of the staff in the outer office could hear

every word. And then, abruptly, all noise ceased, followed by an ominous thud.

The Kid came out of the office, his face white. He said three words.

"I've killed him!"

Naturally, we were called in. The Doc, however, was puzzled. There wasn't a mark on the corpse. He glanced up at me.

"This guy wasn't murdered! He died of heart failure."

The Kid just stood, looking down at the corpse, muttering to himself: "I killed him . . ." over and over. It was beginning to get on my nerves. I told him to shut up and turned to the Doc.

"Sure, Doc? After all, the kid says he killed him."

"I'll arrange an autopsy, of course," said the Doc, "but I don't think there is any doubt about it. The Kid's upset; doesn't know what he's saying. I tell you there isn't a mark on the corpse."

I turned to the Kid.

"How about that? Why d'you say you've killed him?"

The Kid turned to look at me, and his eyes held an expression which chilled me. He said, coldly and deliberately: "I killed him."

He turned and walked towards the door, but a sergeant moved to bar his way.

The Kid said: "Get—away — from — that — door!"

I just gaped. "The cheek of the runt," I said. "And where do you think you're going?" all sarcastic like.

Without turning, the kid said: "I'm leaving. Tell your sidekick here to move over if he wants to go on living."

The situation was ludicrous. Here was a runt of a kid trying to act tough. I almost laughed outright. I think I might have at that, except for the shock I got the next moment.

The sergeant, grinning confidently, grabbed the Kid's arm.

"Now, sonny," he began.

The Kid looked at him and the sergeant's face twisted with pain. He clutched at his head, howling, and then flop-

ped to the floor, suddenly quiet.

We stood there for a minute, me, the Doc and the two remaining cops.

And then, Ferguson drew a revolver with blurring speed and fired, point blank, at the Kid's back.

The slug slammed the Kid to the floor, where he writhed in agony. He turned his head and glanced up at Ferguson, his eyes filled with pain and hate.

Ferguson screamed suddenly, and clutched at his head. And so help me. I saw a thing I shall never forget.

Smoke rose from his head, and then, horribly, his skull split open with an audible rip. The corpse thudded to the floor like a sack of coal, spluttering brains, blood and gore over the carpet.

I was frozen with horror, my stomach heaving with threatened nausea.

The Kid turned to look at me, eyes blazing, then sagged suddenly inert. But not before a sudden, terrible pain knifed through my head, bringing me to my knees. When I climbed groggily to my feet it cleared as suddenly as it had appeared.

The others were staring in horror at the corpses of the sergeant and Ferguson, the remaining cop retching up his breakfast.

Later, the bodies of Kruger, the sergeant and Ferguson were examined, especially the brains. All were found to be cremated. It was as if they had been seared with unimaginable heat. The greatest puzzle was the Kid. The bullet that Ferguson fired hadn't killed him. His brain was also in a cooked condition. The Doc couldn't figure this. It didn't make sense—in fact nothing made sense. The poor Doc was going crazy trying to figure what he would show on the death certificate.

I had a theory, a crazy one. It took imagination to appreciate it, so I didn't say anything to the Doc about it. I sensed he would laugh at me, and have serious doubts

about my sanity. The only thing I couldn't figure and which made me doubt my theory was the Kid. Why was his brain affected?

Later I found out, and it proved conclusively, to my mind, that my theory was correct.

In Kruger's office I noticed that directly in line with where I had been standing when assailed by the sudden headache—and in line with the Kid's position on the floor —was a mirror.

Now I think the kid was a mutant, and could produce a bolt of mental energy which killed anyone in its path. What I think happened was that he directed one at me—but it was reflected back at him from the mirror.

A crazy theory? Maybe . . .

Now in the bar having a drink and glancing round, I see a girl looking at me. There's nothing particularly strange in that—it's happened before. But for some reason or other she reminds me of somebody. She's some looker, too, very pretty, swell figure, greenish eyes . . .

The eyes! I've seen eyes like those before, though not quite the same shade of green. But the expression is the same.

A thought has just struck me. I wonder, did the Kid have any brothers . . . or sisters?

Suddenly, I feel weak and afraid. She's looking at me, a fixed smile on her face. But her eyes aren't smiling.

And my head is beginning to ache.

**ANSWERS TO**

## DO YOU KNOW—YOUR PLANETS?

(See page 110)

(1) Jupiter—it is larger than all the others put together.
(2) Either Mercury or Pluto. Astronomers aren't sure yet.
(3) Mercury. 350° C. on the light side.
(4) Either Neptune or Pluto, probably Pluto.
(5) Earth.
(6) Saturn.

# THE NOR-WEST SCIENCE-FANTASY CLUB

*by A Hopeful Provincial*

THERE was a time at the beginning, when Manchester did have sunny weather, and strangely enough it was well within our lifetime. It was during this period that a Mancunian received sunstroke. Thus was born the idea of the formation of a science fiction club, the first post-war club outside of the London circle. He was, as many other S.F. readers are at the beginning, a sane, likeable chap, with no other idea than to get a few other S.F. readers together to talk S.F., but now the sorry story begins:

With all innocence in the world he enquired of one Ken Slater, who was then running Operation Fantast, if there were other keen readers in the local provinces, and if so, could he have their names. Meanwhile he had contacted one Eric Bentcliffe, and the idea of forming a club simmered between them. What an idea! It couldn't go wrong! They became firm friends, and much correspondence passed between them. Happy and congenial were their letters, talking S.F. and dreaming of a club. Eventually twelve addresses were received from Ken Slater. Happy day, now they could really get down to forming a Club. Each address was written to, each told about the dream. Then—the first taste of fandom. Only two answered. Still not downhearted, he answered the two letters. They were from A. E. (Taffy) Williams and Frank Richards. It was decided to meet at the Oxford Hotel. How excited he was awaiting the day! He couldn't work. He couldn't sleep.

The great day arrived! He collected all the mags he had, and checked up on his authors. They had never seen each

other but there was no difficulty in finding each other—there was a certain air . . . Then occurred the most interesting session he had ever had, or had since. They actually talked S.F., he, Taffy, Eric, Frank. Time went too quickly.

It was decided that they must meet again and give the same opportunity to other S.F. enthusiasts. The N.S.F.C. began to take shape. A room was hired at the Waterloo Hotel, meetings to be held fortnightly on the Sunday evening. A policy formed—to introduce newcomers to this form of imaginative fiction; to welcome those already acquainted with S.F.; to popularise S.F. wherever possible. Everyone was welcomed.

Propaganda went out, fanzines—what few there were then—referred to the formation of an S.F. Club in Manchester, until eventually they were referred to as the "mushroom" by Walt Willis. (The N.S.F.C. was also a topic in Projectiles in *Authentic* Nos. 7 and 12—*Ed.*) Announcements appeared in evening papers; members began to trickle in, until, within the first month, we had a round figure of twelve, including one female, Frances Evans. A name was given to the Club—it became the Nor'-west Science-Fantasy Club. It was great fun in those days. The day the Club was visited by a reporter was one of tremendous excitement; he gave it quite a write-up, too.

Discussions were many and varied, from the unknown to space flight, from rocket ships to rocket projectiles, from gunpowder to atomics. Members were joining from many parts of Lancashire and Cheshire. One Norman Weedall came from as far as Liverpool; there was no Liverpool S.F. Association then. Discussions became fast and furious, visits were arranged to various places of interest. The N.S.F.C. began to increase. The number of members present at each meeting

was then between twenty-five and thirty. A library was formed, giving all members the opportunity of borrowing all kinds of mags, mainly American. They were then hard to get, and the only reprints then were *Astounding* and the great *Unknown*. British S.F. was few and far between. A printed fanzine was started and then dropped.

Members began to join from all parts of the U.K. until eventually it was decided that they—country members—should have something in return. A fanzine was planned.

Meanwhile, members were visiting, and having their first taste of, conventions. Then they had a shot at their own convention, the Mancon, a one-day success. Eighty to a hundred fans and professionals were present. Eventually, after many birth pains, their first fanzine was issued, then dropped through lack of facilities. Another attempt was made, a duplicator obtained, and out of the storm was born *Space Times*, edited by Eric Bentcliffe, published by Eric Jones.

Slowly a change of attitude became more noticeable; tempers were becoming frayed, keenness was diminishing, rules were made but just as quickly dropped, other interests were attempted, but still membership slackened off. The library was still attracting people, but now more S.F. was available and easier to obtain. Only the keen enthusiasts now remained. Members attending had dropped to twelve. Visits were made to the now-formed Liverpool S.F. Association and the visits were returned. Attendance showed a slight increase. Visits to the N.S.F.C. were made by Ken Slater, Lyell Crane, E. C. Tubb, and John Russell Fearn. Yet differences of opinion were becoming more pronounced. *Space Times* was becoming a headache. Changes kept being made in format and staff. Attending the Club meetings was almost becoming a duty rather than a

pleasure. Yet, whatever was tried to regain the earlier interests, nothing proved entirely successful. It was becoming obvious that the N.S.F.C. had become too big —over a hundred members scattered throughout the U.K. and in the U.S.A. instead of being just a local Club. Something had to happen.

Came September, 1953, when plans were being prepared for creating the Supermancon, and it was then decided that the N.S.F.C. would go out with flying colours while making a great success of the Supermancon, after which the N.S.F.C. would no longer exist in its present form. An informal get-together like the London circle seemed to be the answer—a few enthusiasts meeting together, welcoming any other fan who popped in at the chosen site.

Came the Supermancon—The Magnificent Flop—as quoted by Walt Willis. The N.S.F.C. apparently wasn't going out as hoped, with flying colours. Still, the previous idea was followed up, a search for a suitable pub for the informal get-togethers was made. The Thatched House was found. We have now arrived up-to-date. Are these informal sessions the answer? No subs, pop in when you like, and get togethers are every Sunday evening, no officialdom. The future will show. "The Manchester Circle" has been born. How long will it live? Will this be a happier reign of the Manchester and District Fans? It is hoped so. The London Circle has been going a long time.

When in Manchester visit the Thatched House, any and every Sunday in the back room. You'll find it in Newmarket Place, behind the "Manchester News" Offices, Cross Street, off Market Street. Everyone welcomed.

# The ways of Science—2

by FRANK WILSON, B.Sc.

In general and very roughly, scientific method is often called by the name "induction." In fact, it is most often a combination of induction and deduction. However, we shall go on to consider certain aspects of induction, the first of which is *simple enumeration.*

This is a kind of induction which, though not deductively valid, is essential to the day to day running of our lives. In simple enumeration we say, for instance, "In all *observed* cases of tuberculosis, the tuberculous bacillus occurs; therefore, in *all* cases of tuberculosis, the tuberculous bacillus occurs." Informally, we are very apt to say, "Every time any one has ever seen A happen, B happens, too; so A is *always* accompanied by B." We wouldn't get very far if we didn't reason like this—and science wouldn't get very far if it *only* reasoned like this. Simple enumeration is a sort of best-we-can-do-at-the-moment reasoning. And a simple enumerative conclusion is completely disproved by the discovery of even *one* contrary instance.

The example usually given concerns swans. Once, it was commonly accepted that "All swans are white" because no one had ever seen a swan that was not white. However, this conclusion had to be abandoned without question as soon as black swans were found in Australia.

The importance of simple enumeration in scientific method is that it is usually the first stage in the study of some topic. Without it, in the early stages, sciences could not begin. But it is certainly a method which should be abandoned as soon as possible in the development of a science. Physics dropped it long ago. Psychology is in the process of dropping it now.

It would be wrong to look upon simple enumeration as a process of mere counting. Counting it is, to be sure, but what are counted are in-

stances *of a common nature*. The inference involved in simple enumeration depends on the recognition or this common nature, or, in other words, in the recognition of an analogy. And it is with analogy that we must deal next.

Few aspects of scientific method are so tricky to use, and so erroneously used by the beginner and the man in the street as analogy. This is because it is so easy to recognise resemblances but not so easy to recognise *relevant* resemblances. Just because a number of things have a certain feature in common does not mean that they are fundamentally analogous. There must be millions of things which have the feature *red* in common, but no one would suggest that there is a fundamental relation between, say, a red scarf and a red tomato. Nevertheless, many people believe that all persons born in a certain place are of a certain type — belligerent, amorous, cunning and so on— and this is no more sensible than the scarf-tomato example.

On analysis, it can be seen that the usefulness or importance of an analogy depends upon two things—the type of initial resemblance and the scope of the properties which are stated to be fundamentally similar.

In all analogy there is inference. We say, in effect, "Seeing that A is $x$ and $y$, and B is $x$, then B is also $y$." The initial resemblance here is $x$; $x$ is the thing which we claim is possessed by A and B. Now, if $x$ is of such a nature that $y$ (the inferred property) would account for $x$'s belonging to A and B, then the analogy is a strong one, and it is probably true that B is also $y$.

Here is an example of this point: "A metal rod (A) is longer than it was ($x$) and is hotter than it was ($y$). This wooden rod (B) is longer than it was ($x$), so it is hotter than it was ($y$)." Naturally, this is not *proof*, but it is good analogy.

Now let us consider the scope of the properties that are inferred to be connected ($y$). The more extensive, the more detailed, the more all-embracing these are, the *less* effective will be the analogy.

Conversely, the more precise and limited their scope, the stronger will be the analogy. Also, the more comprehensive in scope the *implying* properties ($x$) are then the stronger will be the analogy, and conversely.

Put more simply, an analogy has greater power when the relevant resemblances are numerous and wide in scope, and when the inferred properties are few and narrow in scope.

So much for analogy. Now we'll move on to the more fundamental idea of causation. Right at the start, we must say that if you do not believe, as an article of unproven faith, that everything has a cause, then there is no point in your reading further. You are wasting your time reading about the current theories of causation if you do not intuitively feel that causation is the keystone of nature—and quite a few massive intellects seem to think that some things are causeless. If *you* think that, then pack up right away, for if some things have no cause there is no reason why *all* things should not be causeless, and there is no sense in beating your brains out analysing the factors concerned in something which you believe does not exist.

Those who are still with me will be willing to accept the idea that there are uniformities and multiformities observable in nature. Let me explain these two terms for the benefit of those who haven't met them. We all expect ice to be cold, molten lead to be hot, snow to melt, rain to *fall*, hot air to rise. If we step into a swimming bath of water we should expect to sink. If we hit a nail with a hammer we expect it to be driven inwards, not outwards. In short, there are thousands of things, events, and phenomena in the world that we simply take for granted as being so. We should be surprised only if they were not so—if, in the words of the poet, "fishes flew and forests walked." These things are the *uniformities of nature*. They are *regular* occurrences.

And there are other occurrences which, though quite *irregular* are, nevertheless, not surprising. You don't see a man mauled by a lion every day of your life, but when

that unfortunate incident occurs you do not consider the fabric of the universe to be disrupted. Similarly, you may see a black dog run over by a yellow car on a particular corner of your street, but you don't think a great deal of it, even though you've never experienced it before and have no great expectation of seeing it again. You would feel surprised and rather uncomfortable about the stability of the universe only if you saw a black dog run over by a yellow car on that particular corner every day of the week. These things which are quite "natural" but are, so to speak, "accidental" or "casual," are the *multiformities of nature.*

What is all this about? Well, the initial business of science when beginning to explore a topic is to separate the multiformities from the uniformities involved in the topic under consideration. Multiformities are useless to science. You cannot get to grips with something that may or may not happen, or with two things that may or may not be connected. It is essential in the early stages of all studies to set out a list of "certainties"—of uniformities. This, of course, is where simple enumeration and analogy come in.

We go around "counting" all the instances where, say, snow is put on a hot-plate or similar heater, and end up with the idea that snow melts when heated. When we see another sort of solid turn into a liquid, we argue from analogy that the new solid has been heated. And so we go on, discovering uniformities of increasing generality and degree of abstraction. The ultimate business of science, strangely enough, is to make everything as abstract as possible! But we shall examine that idea later.

Somewhere along the line there is an unconscious transition from the level of common sense to the level of science. The prevalent idea that science is merely organised common sense is entirely erroneous. Science and common sense are very different things, though the early stages of science bear resemblance to ordinary common sense. Broadly, common sense is concerned and satisfied with explanations of a *concrete* character, whereas

science tries to get away from the concrete and is satisfied ultimately only by the highest *abstractions.*

Elementary science, certainly, is on the level of concrete things—that is why it seems to the lay person to be mere organised common sensc —but as any science develops, becomes more advanced, it moves further and further away from the concrete or *particular* and more nearly approaches the abstract or *general.* The most advanced science today, physics, is also the most abstract; at its frontiers it is dealing with things that are unobservable and unreal, imaginable only. Physics has a long history of separation of uniformities and multiformities.

Now the uniformity-multiformity concept is intimately related to the notion of cause. This may be more readily apparent if we formally define them: A multiformity is a set of occurrences, or of properties, such that some one, or more than one, member of the set sometimes recurs without the rest. A uniformity is a set of occurrences, or properties, such that if any one of them recurs, the others recur. (These definitions are taken from *A Modern Introduction to Logic*, by L. Susan Stebbing, Methuen, 37s. 6d. An extremely good book.)

Even at the common sense level it is fairly easy to see that the members of a multiformity are not necessarily casually related, and that the members of a uniformity *are* casually related. We must now examine just what we mean by "casually related."

Here again we have a distinction between the layman and the scientist. To the layman, cause is what makes things happen in space and time; cause gives rise to change; cause has an effect. These ideas are perfectly suitable for everyday use but they are too crude and vague to be of service to science; they do not *significantly* explain causation. Even so, science must accept these ideas in its early stages or there would never be any later stages. But, as with simple enumeration, the common sense concept of cause must be abandoned as soon as possible in the development of a science.

The key to the difference between the lay idea of cause and the scientific idea of cause is that science does not accept the mere change, but analyses the change and examines the *relations* involved. A plain man will say that a murderer died because he was hanged; the cause was "hanging," the effect was "death." And he will leave it at that. The scientist will not accept either "hanging" or "death" as a single phenomenon. He will analyse each into its component parts and will find finer and finer relations between the parts of the two things. Even the scientist does not get to the very ultimate cause of this man's death, but he tries to get as near as he can. That is what makes him a scientist.

Another way of putting this is that the layman is content to find a many-one relation, whereas the scientist seeks a one-one relation. There are other things besides hanging that "cause" death. The scientist wants to find the common factor in all these "causes," so that he can say "*this* results in death, and death *never* occurs unless *this* is present." *This* will be, in the scientist's view, the cause of death. Actually, it can't be done, because death is such a complex event, but the example should make clear the difference between the layman's and the scientist's way of looking at cause.

Next month we shall examine some of the methods whereby the cause of something is determined.

## TEST YOUR KNOWLEDGE OF THIS ISSUE

The answers to all these questions are to be found in the text of this issue—and also on page 131.

(1) Who is the Astronomer Royal?
(2) Is camphor soluble in water?
(3) Do all things have a cause?
(4) Who wrote "Take-off"?
(5) Which fanzine is for ladies only?
(6) Which fan group hasn't got an official name?

*Reviews of recent*

# FANZINES

*by The Editor*

**FEMIZINE.** Here come the ladies! Femizine, which is "edited and printed . . . on behalf of all femme-fans," is meant to be "not too serious, but not frothy" (what about frilly?). Its aim is to unite the female minority groups in the U.K. Good idea. With one exception (readers' letters) the contents will be wholly feminine in origin, but it is hoped that men will suscribe. Of course they will; try and stop them! The first issue is free, while copies last, to all who write for it, from Frances Evans, School House, Teignmouth Street, Collyhurst, Manchester, 9. Future issues will cost 9d. each or 2s. 6d. for four issues from the same source. Material for publication should be sent to Ethel Lindsay, 126 West Regent Street, Glasgow. Letters and fanzines (for review) should go to the Editor, Sgt. Joan W. Carr (W.R.A.C.), c/o R.A.P.C. Sgt's Mess, Maida Camp, M.E.C.F. 17. (Mail takes about three weeks to get to Joan.) This first issue has eighteen pages. It is said that the next will have at least thirty. It's good stuff all through. Buy it, please.

**PHANTASMAGORIA** is published by Derek Pickles, 197 Cutler Heights Land, Bradford 4, and Stan Thomas, 22 Marshfield Place, Bradford 5, both of Yorkshire, England. The first one of the new series to hand is not overwhelmingly interesting, but Stan and Derek are not asking for subscriptions—*Phantasmagoria* can be yours if you: a, write a letter of comment; b, contribute; c, send a magazine. Most of the contents are about the Manchester Convention—I never want to read about a water pistol again!

**HYPHEN** No. 9 appears to have been edited by A. V. Clarke, of 16 Wendover Way, Welling, Kent, but has a long Manchester Convention report from Walt Willis and a couple more by other people. There doesn't seem to be any subscription particulars in this issue, but I suppose most people know them by now. (It usually comes from Walt Willis, 170 Upper Newtownards Road, Belfast, Northern Ireland.) This issue doesn't seem to be *quite* up to its usual standard, no doubt due to Conventionitis, but is still pretty good.

**THE OFF-TRAIL MAGAZINE PUBLISHERS' ASSOCIATION** is an oldish idea newishly come near fruition. The Association is based on the American Fantasy Amateur Press Association, which has 65 members who each receive about 350 pages of fanzine material per quarter. The *OMPA* plans to have a limited membership of 25, at least to start with, each of whom is required to write (and duplicate 28 copies) eight sheets of opinion, artwork or other types of fan literature per year. The subscription is 6s. for the first year—to cover postage and envelopes, etc. Membership is open to anyone who can prove activity in the amateur publishing field during the previous twelve months, and a waiting list will be made after the first 25 members have been elected. The Association's editor (A. V. Clarke, 16 Wendover Way, Welling, Kent) sends out identical bundles to all members quarterly from March. President of the Association is H. K. Bulmer, 204 Wellmeadow Road, Catford, London, S.E.6. Subscriptions and applications for membership should be sent to C. R. Harris, Carolin, Lake Avenue, Rainham, Essex.

# MARCH of SCIENCE

*News of some recent scientific discoveries*

THE UPSURGE OF INTEREST IN the fairly new study of ageing (gerontology) will be of interest to science fiction readers who are concerned with how humanity is going to get to the stars. It has been pointed out that ageing does not seem to be a normal process, if one includes senescence in the term, for senility is not found among truly wild animals[1]. It would appear that senescence is a condition of civilisation, or at least of domesticity. And it is therefore legitimate that scientists should study the problem of ageing in this light. Recently the Ciba Foundation announced its intention of supporting such work by the award of prizes, scholarships and lectureships. A highly commendable stimulant to science.

THOSE WITH A LEANING towards sociology will be interested and perhaps intrigued by a recent paper from Dr. H. J. N. Horsburgh[2] of Edinburgh University, in which he discusses the real reasons why people accept the limitations of moral rules. Here we see how the truly erudite intellect deals with the psuedo-significant ideas of semantics. And we also discover that most of us are not quite as sensible as we might have thought!

THE POSSIBLE RELATIONS between viruses and bacteria have intrigued biological scientists just about ever since viruses were discovered. Here perhaps more than anywhere lies the clue to the transition from non-living to living matter. Not long ago some Russian workers claimed to have reciprocally converted certain types of bacteria and viruses, but the claim was received by the rest of the world with considerable reserve. Now, however, two workers at the Virus Department of the Tropical Institute, Hamburg, have carried out experiments which indi-

cate that there is no "dissimilarity between the central body of pox viruses and the nuclear structure of bacteria"[3]. It may well be, then, that we are approaching a deeper understanding of the significance of these lowly forms in connection with the origin of life.

THE ATTENTION OF ALL readers interested in electronic brains is directed to a recent paper[4] by Dr. A. D. Booth, of the physics department of Birkbeck College, in which he discusses in great and lucid detail the design and functioning of mechanical translating machines. These incredible devices are able to receive a card on which is typed a message in one language, and to give out a card on which is typed a translation in another language. The machines will work not only for languages of similar structure—as, say, French and English—but also with languages of quite distinct form and characters, as for example, Russian and English. Naturally, the designer of the instrument must have a good knowledge of many languages, so the machines would not be useful for first contact with alien races; but they would certainly come in handy for long-term communication.

A CONSIDERABLE ADVANCE IN therapeutic medicine has resulted from the discovery by Dr. Alan Kekwick and Mr. G. L. S. Pawan, of the Middlesex Hospital Medical School, that one of the adrenal cortical hormones is effective when administered by mouth[5]. Hitherto, the only hormone known to be unaffected by the digestive juices, and therefore suitable for oral therapy, is the thyroid hormone, thyroxin. Since this adrenal cortical hormone ("aldosterone") is standard treatment in cases of Addison's disease and has to be administered over long periods, the new method of giving it to the patient greatly increases the mental well-being of the patient by avoiding the necessity for frequent injections.

BUZZING COGITATION IN MANY circles has followed the recent publication of a paper by

Patrick Moore, in which he discusses the possibility that Earth has a second Moon[6]. After reviewing the theoretical basis for the old idea of a second Moon, Mr. Moore concludes that if there is another body out there it must be too small to rank the title of satellite, and "can be nothing more than a meteor-sized rocky particle, irregular in form and with a gravitational pull too small to be detected even by the most refined methods." This, of course, raises the question of when is a moon not a moon, and seems to be answerable only by personal prejudice. Who is to say what is the minimum size for a satellite? It may be that a more scientific way of looking at it would be to use the term satellite for a body of any size at all *which travels in a closed orbit round a planet.*

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1. Medawar, P. B., *An Unsolved Problem in Biology*, University College, London.
2. Horsburgh, H. J. N., *Mind*, LXIII, 345 (1954).
3. Peters, D., and Stoeckenius, W., *Nature*, 174, 224 (1954).
4. Booth, A. D., *Discovery*, XV, 280 (1954).
5. Kekwick, A. and Pawan, G. L. S., *Lancet*, ii, 162 (1954).
6. Moore, P., *J. Brit. Interplanetary Soc.*, 13, 202 (1954).

**ANSWERS TO**

## TEST YOUR KNOWLEDGE OF THIS ISSUE

(See page 126)

(1) Sir Harold Spencer Jones (see "Book Reviews").

(2) No (see "Back to Go Forward").

(3) Some say yes, some say no (see "Ways of Science").

(4) C. M. Kornbluth (see "Book Reviews").

(5) None. But "Femizine" is by ladies only (see "Fanzines").

(6) The Manchester group (see page 117).




## FICTION

ANOTHER anthology comes from T. V. Boardman (14, Cockspur Street, London S.W.1), and it is pretty good, though not in the top flight. **STAR SCIENCE FICTION STORIES,** which costs 9s. 6d., is a collection of fifteen stories edited by Frederik Pohl. The anthology previously appeared in America, of course, and is predominantly American in flavour, but is none the worse for that. The only British authors represented are John Wyndham (*The Chronoclasm*) and Arthur C. Clarke (*The Nine Billion Names of God*). The Americans are all somewhere near the top of the tree, though some are not quite as high as others. The anthology as a whole is a bit patchy, but the poorer stories are fully compensated for by pieces from Clifford D. Simak, Ray Bradbury, Isaac Asimov, Henry Kuttner and C. L. Moore. C. M. Kornbluth (author of the accomplished book *Take-Off*) is not up to his usual standard here; but his standard is so high that this does not matter.

Lester del Rey, Fritz Leiber, William Tenn, H. L. Gold, Judith Merril, Robert Sheckley and Murray Leinster are runners-up in the contents list. All good, sound stories. Nothing world-shattering. Nothing dull. Quite a good anthology as these things go these days.

The only other fiction title

we have for review this month is another Boardman book, this time a novel by Frederick Brown. **PROJECT JUPITER** is Brown's second science fiction novel—if one can class his *What Mad Universe* as science fiction—but he has written a good many mystery stories, and thereby brings a well-practised writer's craft to the job of tackling a new medium. On the whole he does it very well, and this book is a much closer approximation to the general idea of science fiction than was his previous one.

Also, it extends across a broader, deeper field, and takes on added importance because of that. The book is set in the future—1997. The bright boys have already "conquered"the Moon, Mars and Venus. Their roaming eyes now alight on Jupiter. By a gift of oratory or hypnotism that seems to be quite beyond present-day scientists, they talk Congress into forking up the money for an expedition to Jupiter. At least, that seems to be the general idea, though it is woven so delicately through the book that one is rarely reminded what the book is all about.

But that does not matter somehow. The story has such charm and hypnotic power that you just go on reading it, not *caring* what it is about, but just rejoicing in the fact that it *is*.

It costs 9s. 6d. and has one of the most awful dust jackets ever to appear on a science fiction book.

## NON-FICTION

SIDGWICK & JACKSON (44, Museum Street, London, W.C.1) have done us all a great service in bringing out an English edition of Giorgio Abetti's *Storia dell' Astronomia*. The English title is **THE HISTORY OF ASTRONOMY**, and the translation from the Italian has been made by Betty Burr Abetti. The book costs 25s., and is worth every penny of it. Splendidly produced,

with a foreword by Sir Harold Spencer Jones, with 34 plates, many of them beautiful "telescope" photographs, the book has 345 + xviii pages of delightful text.

That it is authoritative is attested not only by the Astronomer Royal's foreword, but also by the fact that Abetti is perhaps the foremost of Italian astronomers. He is Director of the Arcetri Observatory outside Florence. He goes back to a time considerably before the Greeks and comes forward, interestingly all the way, to the very latest events and instruments. Non-technical, full of human interest, and with a sly thread of humour throughout, this *History* is to be very highly recommended to all our readers.

Another True Book from Frederick Muller (Ludgate House, E.C.4) is a reprint of an Australian book. This edition is called **THE TRUE BOOK ABOUT INVENTIONS.** It costs 6s., and is rated as a juvenile, though there is much in it that will entertain and instruct adults. The inventions dealt with range over printing, steam engines, the telephone, the spinning wheel, road vehicles, photography, aircraft, atomics and electronics. A nice little book for the curious person of all ages.

**ADVENTURE OF THE WORLD**, by James Fisher, comes from Rathbone Books (Adprint House, 51a, Rathbone Place, London, W.1) at 10s. 6d. It is incredibly cheap and incredibly good. We use the word "incredibly" because it is somehow unbelievable that in these austere days a book of such superb design and production could be put out so cheaply. In large format, 9½ x 12½in., choc-full of beautifully reproduced and executed coloured pictures, telling the story of the world, its birth, its geography and its relation to man, this book is something that every serious parent should buy for his children—

and should read himself from cover to cover.

Here we have a fine example of teamwork in the production of a book. The people concerned with this excellent volume are too numerous to mention, but it must be said that authors, artists, publishers and printers have worked together as a unity. That they have produced a thoroughly outstanding book is their just reward. Please buy it and keep it.

Part II of **SCIENCE AND OURSELVES**, by E. J. Saunders and E. R. Franklin, has been published at 7s. 6d. by John Murray (Albemarle Street, London, W.1). It is a very nice book of elementary science as seen by its application to everyday affairs. It is highly recommended to all who are a little shaky about things scientific. It covers a very wide range of topics and will give the reader a pretty good grounding in most branches of science.

Pitmans (Parker Street, Kingsway, W.C.2) have brought out two books that will be of use to science fiction fans. The first, for those with an eye on to-morrow, is **THE HELICOPTER AND HOW IT FLIES.** This is a very slim volume costing 10s. 6d., which seems rather a lot, though the information contained is certainly detailed and specialist. There can be very little about the helicopter that this book does not cover. It is written by John S. Fay.

The second Pitman book is for those who started off on the wrong foot with algebra. **A FIRST YEAR ALGEBRA**, by T. A. Humphreys, costs 6s. (answers separately 2/6), is written with an entirely new approach to the study of elementary algebra. Anyone who has trouble with this subject, at any level at all, is well advised to turn back to this efficient little book and cover the groundwork in a pleasant but thorough manner.



# Projectiles

## OVERSEAS SECTION

*NO MISTAKE*

In the article, "Solar System No. 9—Uranus" you state that Uranus has a gravity of 0.92 of Earth normal and yet has an escape velocity of 13 m.p.s. This statement, I think, however, is a little wrong. For Sir Isaac Newton in one of his laws of gravity states that every body attracts every other body with a force proportional to its mass. Yet you write that Uranus, whose gravity is less than Earth's, has a greater escape velocity. Please let me know if I am wrong in accusing you of a technical error of such magnitude.

3502950 Cpl. Clarke,
R.A.F. Staging Post, Mauripur,
Karachi.

*Delighted, Corporal! What you have forgotten is that escape velocity is the square root of twice the gravity times the* radius *of a planet: and Uranus has nearly four times the radius of the Earth. Work it out for yourself. But thanks for writing and for the compliments in rest of your letter.*

*HOW?*

*How* do you *do* it? Since hearing your most intriguing series of talks on our C.B.C. when you were this way, I have managed to read through the contents of several *Authentics* without collapsing from sheer shock. And why shock? Shock at the fact that science fiction can-does have an adulthood. Since the tender age of twelve I have been subjected to an almost continuous environment of bug-eyed monsters, and I have received a thorough education in the art of the male and female nude and their anatomy. I have learnt much of the sicknesses of humanity from these books, but none of the art, none of the beauty of man . . . his dignity, his æsthetic virtues.

But, my dear Mr. Campbell: then I found *Authentic!* And I might add, science fiction. And furthermore, it was *Authentic Science Fiction*, from all points of view.

What flaws do I find in your magazine? Of course, I'd like to see you junk the readers' section—unless you print my letter; then I'll

feel better—and give us some more non-fiction. Warning: Do not get too ambitious at feeding non-fiction to Canadians. Canadians, like most, are escapists at heart. Let us see a prudent increase in the non-fiction.

You know there was something quite charming in *Mary Hell's* which smacks lightly of Verdi. It was not space opera carried to the usual extreme; it was not detective fiction, nor true romance; it was not *too* sentimental. It could have been done better—it could also have been done worse. I can feel no qualms at calling it the best story of your May issue, and *one* of the many best I have read. Say! You know, with a little polish, a little grace, and a little better writing, Mr. Temple is going to become a good writer: that was second best in your issue.

My pet love is ESP. And it pains me terribly to see writers make such a *pot pourri* (and I mean a rotten hash) out of it. Despite the most fervent attempts of scientists to bring out to its fullest extent this fascinating power, only the most unconvincing of results have—well, *resulted.* And yet one writer expects me to believe in a completely psychic group of people: yea, not in the year 5491, but rather *now*, in the year 1954! Heaven forbid! As physics is a science, and in stf we attempt to perceive probabilities according to the laws of physics; as biology is a science, and in stf we attempt to perceive probabilities according to the laws of biology; as psychology is a science, and we try to perceive probabilities in behaviour according to the laws of psychology; so psiology is a science: and in stf we should at least pay a little attention to the work of men who have spent their lives attempting to formulate the laws of this science—if we are going to explore clairvoyance in space, let us first examine the work that has been done in the investigation of the distortion (semantic and otherwise) of the elements of the object perceived.

It's a great magazine, so keep up the good work. So help me if you *ever* leave science fiction, then so shall I, but in another direction.

Errol Pritchard,
177-24th Avenue East,
Vancouver 10, B.C., Canada.

*The kind of letter we like to see, Errol, though we'd take you up on a few points: a, we don't think Canadians as a whole are more escapist than others; b, psiology is not a science, yet, though it tries hard to be; nevertheless we agree about the necessity for a serious approach to ESP; c, don't be rash about leaving science fiction; there* are *other good magazines around.*

*UP DOWN UNDER*

As an Australian fan I'm afraid we can't boast of a really good S.F. Mag. but yours seems to have taken the place, as far as I'm concerned, of any other mag. in the world. English authors give you good, straight-out science fiction. The inclusion of short stories, I think, is splendid. All in all you have a trend towards something different, and that is a good sign.

M. G. Pettingill, Box 276,
Millicent Road, Mt. Gambien,
South Australia.

*Thank you for your kind remarks, Mr. Pettingill. We are glad you like us so much. And we hope it stays that way. Write again.*

*COCKTAIL*

I read English as fluently as Danish, but I have no opportunity to write or speak the language, so every time I shall use a word I can't find it, then so soon as I read it I know it. I, therefore, beg you *a priori*, excuse my very bad English! What a pity we can't use the brain-waves where are no confusion of languages! I'm not used for writing to editors, but as I see from Projectiles, you don't provide for silent readers, but let your opinion guide from the writing readers alone. I will, therefore, politely remind you of even many silent readers. If you will have a sure statistic, you ought to enclose a form or questionnaire in every ASF., for perhaps 2 or 3 months, with an index over the different articles (series) which appear or can appear in ASF. Especially whether our readers prefer more AS fiction or nonfiction, and one or two lines for individual propositions. Beware the very fine standard of novels you have now; for my sake the novels may be longer and plenty of them. And one proposition, which I think many others will approve: let us have a special good and great novel—a big one, too—continued through 8 or 12 issues of ASF. Your mag is the best I have read and you are now high over your earlier standard.

Before I stop, here you have a recipe for ASF Cocktail:

Take: 25% authentic-science
25% Ald. Huxley and Orwell
15% Nig. Balchin
20% Phantasy
15% D. H. Lawrence.

Shake it to a fine emulsion.

A. v. H., Vordingborg, Denmark.
(Name withheld by request.)

*Your English is a bit shaky, but we made it out all right. Most readers who write in—and the others have to take what they get, for being lazy—disagree with you about the serialised novel. But I'd like to hear their views on your cocktail recipe. Keep writing to us; it's good practice!*

---

## HOME SECTION

*SERVICE*

Your articles are all first-rate, but special commendation goes to *Planet Farms, Space Travel and the Law*, and the *Atomic Submarine*. But as I say, they are all of interest, and stories apart, I think your mag is doing a service by presenting matter which otherwise would require to be sought in many different publications. I certainly do not think you should reduce the quantity of them—that's in case anyone thinks you should—but though I think it would be a good thing and welcomed in some circles, I cannot see that you can increase them without running the risk of damaging your circulation badly. I'd better sign off now and leave you in peace.

Paul L. Sowerby,
21 Lansdowne Rd., West Didsbury,
Manchester 20.

*Nice to hear from you again, Paul, and to know that you still rate us pretty highly. Thanks for the confirmation that the non-fiction is appreciated.*

*SICK*

On the whole the standard of the stories in Authentic No. 47 is excellent, with one exception—*The Mutilants*. I read your maga-

zine for entertainment and instruction and I found neither in this revolting effort. Even a spine-chiller can be entertaining, although one hardly expects to find it under science fiction, but *The Mutilants* left me feeling very sick. In my opinion this story should have no place in your magazine and I hope you will not publish any more disgusting trash like it.

Alan K. Redfern,
311 Manchester New Road,
Middleton, Nr. Manchester.

*So far, Alan, you're in a small minority about this story. Even so, we won't be running too many of that type; we don't want to get a penny 'orrible reputation!*

*NATIONALISM*

In your issue No. 46, which I found most interesting, you have an article by Peter Summers on *Space Travel and the Law*. At the end of it he makes a politically provocative statement, attacking the idea of national independence. Nationalism, like any other human idea, can take perverse forms, but true nationalists are interested in all nations, not only their own, and I have found more ideas of World Unity among nationalists, willing that their nations should yield some sovereignty to a World Federal Government, for the good of all, than among the apathetic or the anti-nationalists.

I feel that the people that are a danger are those who wish to lead great power blocs, either from personal pride or from a desire to see their nation govern other nations, which is imperialism. This sort of thing will lead to two big power blocs in the world, in all probability, whose leaders may cause a World war in their lust for power, and destroy us all. Small nations cannot wage big wars. True patriots of all nations would work together for the good of all, if given the chance.

Of course we can produce statesmen capable of running the world, but only perhaps if they are willing to be guided by God, rather than by their own pride.

David Stevenson,
Corpus Christi College,
Cambridge.

*Naturally, we entirely agree with all your aims and ambitions, David, and we are pleased that you have stated them so lucidly for us, but we do feel that you are using the word "nationalism" in a quite different sense from that in which it was used in the article. Imperialism ("Empire-grabbing") is a danger, certainly; so is nationalism when it takes the form of unfounded pride in the mere accident of birthplace. The people you are calling nationalists are really internationalists—basing their pride on real values, domestic or foreign. That is what the article meant—national independence to the point of bigotry is a bad thing for any nation and for the world.*

*PAPER*

Couldn't we have something different from that yellow parchment-like paper? It's depressing. It seems to me to be harder on the eyes, it makes one feel one is struggling through a tale. And I'd like to see the printing done right across the page instead of in two columns as at present.

P. E. Rigby, 131 Kensington Road, Southport, Lancashire.

*Sure you could have something different—and then* Authentic *would cost you more. The paper's pretty good as magazines go, and it isn't* really *yellow, is it? And the double column printing lets us get more words to the page by using smaller type than could be read easily in a long line. Want us to cut down on wordage? Sorry, we can't do anything for you!*

*NEITHER*

Just a few words about the cover of No. 47. Will the bridge of hot gases that joins the red giant and the yellow star in the binary follow the yellow star along its orbit until such time that the white member of the twin becomes the nearer of the two, and then flicker across and form a band of even hotter gases? Or should there be a permanent bridge between all three of the stars?
William Hammond, Miners Hostel, Sharp Street, Walkden, Lancs.

*Neither, William. The streak of light issuing from the yellow star is quite unconnected with the red giant. It is a spiral of hot gases—you can see a part of the spiral at the top of the cover—lying in the plane of the binary. True, it "looks" as though the gases are joined to the red giant, and this is just how it looks in a telescope; but it's an optical illusion. Caught you!*

*WITTY*

I have read a fairly immense amount of science fiction, and have published and broadcast an article on the subject, and although I try hard to explain every reason for people reading science fiction to my friends, I find it very difficult to explain that science fiction can possibly have a funny side and that there is such a thing as a "witty" science fiction story, and I have to admit that they are pretty rare. I wonder if you could oblige by printing one?
T. B. Pulvertaft,
55 Oakley Gardens, London, S.W.3.

*Been asleep? We've published several!*


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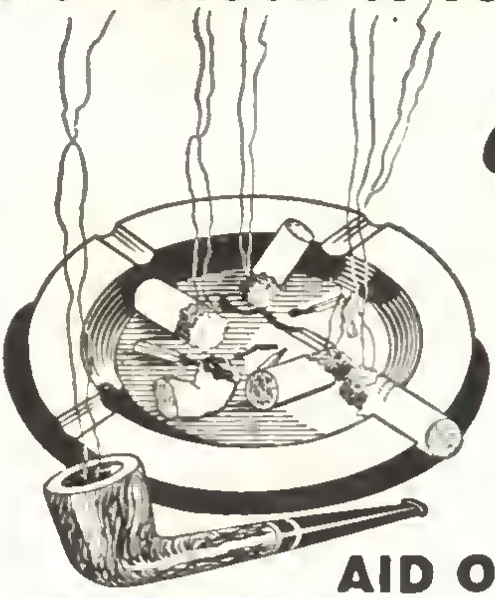
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*G.A.S., Ossett, Yorks*

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*I am very pleased with my APAL. I have been much better in health since using it. It certainly takes away the longing for a smoke. Thanking you very much.*
*Mrs. C.A.H., Coventry*

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*Fifty cigarettes a day for over twenty years is pretty good going and nobody would have me believe that I could ever give it up. Your APAL arrived four and a half weeks ago and I am delighted to say that I have not smoked since.*
*F.F., Hertford.*

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*I bought an APAL from you nearly eighteen months ago, and it did for me all that you said it would. I have not smoked for seventeen months, and have no desir at all to do so.*
*G.H., Marham, Norfolk*

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